University of Alberta

Development of the Picture Story Language Instrument for Deaf Children

By

Rita Vis Dubé ©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Doctor of Philosophy

in

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ABSTRACT

The purpose of this study was to develop an instrument for the assessment of narrative language skills of deaf children, in either American Sign Language (ASL) or English. The instrument developed through the course of this research was called the Picture Story Language Instrument (PSLI).

A comprehensive review of the literature in a number of relevant areas was undertaken prior to developing this instrument. The relevant information from the review is presented with respect to deaf education, language assessment, and narrative language. Based on this review, a number of research questions were presented as the groundwork for the development and validation of the PSLI.

The PSLI consists of six picture stories designed to elicit narratives from children and a coding protocol for evaluating the narrative stories. The stimulus stories contain original pictures developed by the researcher in conjunction with a professional artist. The coding protocol for the narrative stories is based on the story grammar model presented by Stein and Glenn (1979). The development process included validation studies using expert panels, a feasibility study involving Deaf and Hearing adults, and a pilot study involving deaf children.

The main study in the development of this instrument involved a sample of 39 deaf children, ages 4 to 11, from provincial programs for the Deaf in Alberta, British Columbia, and Ontario. Narrative stories collected from the children were analyzed for story grammar and episodic structure using the coding protocol.

The results of this study indicated that the PSLI is a valuable tool for collecting and analyzing narrative stories from deaf children. The younger children in

this study (preschool/kindergarten age) produced stories that differed significantly from those produced by the older children (school-age) with respect to the number of story grammar units produced. Stories elicited using the PSLI increased in length and complexity as predicted for all ages. However, equivalent forms of the instrument were not confirmed in this study.

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CONTENTS

	Page Number
CHAPTER 1: INTRODUCTION, REVIEW OF THE LITERATURE, AND PURPOSE OF THE STUDY	1
Introduction	1
Review of the Literature	3
Bilingual/Bicultural Education for Children who are Deaf: American Sign Language and English	3
Language Assessment of Deaf Children	5
Considerations for Assessment	10
Language Assessment	13
Narrative Language	15
Story Structure Analysis of Narratives	17
Use of Narratives in Assessment	19
Eliciting Narratives	19
Summary	22
Purpose of the Study	23
CHAPTER 2: DEVELOPMENT OF THE PICTURE STORY LANGUAGE INSTRUMENT (PSLI)	25
Introduction	25
Eliciting Narrative Language Samples with Picture Stimuli	25
Development of the Narrative Stories	26
Narrative Panel Validation (Phase 1)	28

Development of the Picture Sequences 33
Validation of the Picture Sequences 33
Narrative Panel Validation (Phase 2) 34
Deaf Education Panel Validation 36
Adequacy of the Picture Stimuli for Eliciting Stories 40
Adult Feasibility Study 41
Pilot Study 49
Participants 50
Materials 51
Procedure 53
Data Analysis 54
Reliability 54
Results 54
Discussion 56
CHAPTER 3: METHODOLOGY FOR THE MAIN STUDY 60
Introduction 60
Population of Interest 62
Proposed Sample 63
Participants 65
Consent and Ethics 68
Materials 68
Procedure 70
Data 71

CHAPTER 4: RESULTS OF THE MAIN STUDY 74

Results of the Test of Nonverbal Intelligence-2 74

Order of Administration of the Stories 74

Story Grammar Elements 75

Results of the Preschool/Kindergarten Group 78

Results of the School-Aged Group 87

Story Grammar 88

Episodic Structure 95

Differences in Story Levels 96

Story Structure by Age 98

Episodic Structure by Age 99

Bio-Demographic Factors 101

Equivalent Forms 104

CHAPTER 5: DISCUSSION 108

Introduction 108

Story Grammar Structure (Question #1) 109

Differences in Story Levels (Question #2) 114

Age Differences (Question #3) 115

Bio-Demographic Factors (Question #4) 117

Equivalent Forms (Question#5) 118

Implications of the Findings 119

Limitations of the Study 123

Implications for Research 126

Future Directions for Research 129

Conclusions 131

References 133

Appendix A: Written Narratives and Picture Descriptions 145

Appendix B: Narrative Panel Questionnaire #1 155

Appendix C: Picture Stories 177

Appendix D: Narrative Panel Questionnaire #2 185

Appendix E: Deaf Education Panel Questionnaire 193

Appendix F: Adult Consent Form and Information Form 201

Appendix G: Interview with Subject A5 203

Appendix H: Story Grammar Scoring Protocol 206

Appendix I: Parent and Child Consent Forms 219

Appendix J: Administration Guidelines for the PSLI 222

Appendix K: Description of the Test of Nonverbal Intelligence-2 224

Appendix L: Teacher Rating Form 225

Appendix M: Parent/Family Questionnaire 226

Appendix N: Description of Programs 228

Appendix O: Description of Subjects 230

LIST OF TABLES

		Page Number
Table 1.	Sample Story (1A)	28
Table 2.	Narrative Panel	30
Table 3.	Judges Rating of Stories – Narrative Panel Phase 1	31
Table 4.	Judges Rating of Picture Stimuli– Narrative Panel Phase 2	35
Table 5.	Deaf Education Panel	38
Table 6.	Median Scores of Judges Responses – Deaf Education Panel	39
Table 7.	Adult Subjects	41
Table 8.	Story Grammar Units Scored	42
Table 9.	Number of Story Grammar Units and Episodes – Adult Study	45
Table 10.	Mean Scores for the Deaf and Hearing Group – Adult Study	47
Table 11.	Differences between Versions "A" and "B" – Adult Study	48
Table 12.	Subjects for Pilot Study	51
Table 13.	Number of Complete Episodes – Pilot Study	55
Table 14.	Pilot Study Results – All Measures	56
Table 15.	Distribution of Children by Age – Main Study	65
Table 16.	Audiological and Deafness Characteristics of the Children	66
Table 17.	Means and Standard Deviations for Story Grammar Units	75

Table 18.	Differences between Preschool/Kindergarten and School-Age Groups	77
Table 19.	Means and Standard Deviations for Story Grammar Scores – Preschool/Kindergarten Group	79
Table 20.	Means and Standard Deviations for Story Grammar Scores – School-Age Group	87
Table 21.	Use of Complete Episodes	95
Table 22.	Differences by Story Level – Story Grammar Elements	97
Table 23.	Differences by Story Level – Episodes	98
Table 24.	Differences in Story Grammar Scores between Primary and Intermediate Groups	99
Table 25.	Differences in Episodes between Primary and Intermediate Groups	100
Table 26.	Univariate Comparisons of Total Scores – Gender	101
Table 27.	Univariate Comparisons of Total Scores – Maternal Signing Ability	102
Table 28.	Univariate Comparisons of Total Scores – Family Deafness	104
Table 29.	Correlation for Versions "A" and "B"	105
Table 30.	Differences between Versions "A" and "B"	106
Table 31.	Differences between Versions "A" and "B" – Primary and Intermediate Groups	107

LIST OF FIGURES

		Page Number
Figure 1.	Deviation Scores – Narrative Panel Phase 1	32
Figure 2.	Deviation Scores – Narrative Panel Phase 2	36
Figure 3.	Deviation Scores – Deaf Education Panel	40
Figure 4.	Number of Story Grammar Elements – Pilot Study	55
Figure 5.	Number of Story Grammar Elements – Main Study	76
Figure 6.	Story Grammar Units – Story 1A (Preschool Group)	80
Figure 7.	Story Grammar Units – Story 2A (Preschool Group)	81
Figure 8.	Story Grammar Units – Story 3A (Preschool Group)	82
Figure 9.	Story Grammar Units – Story 1B (Preschool Group)	83
Figure 10.	Story Grammar Units – Story 2B(Preschool Group)	84
Figure 11.	Story Grammar Units – Story 3B (Preschool Group)	85
Figure 12.	Story Grammar Units – Story 1A (School-Age Group)	89
Figure 13.	Story Grammar Units – Story 2A (School-Age Group)	90
Figure 14.	Story Grammar Units – Story 3A (School-Age Group)	91
Figure 15.	Story Grammar Units – Story 1B (School-Age Group)	92
Figure 16.	Story Grammar Units – Story 2B (School-Age Group)	93
Figure 17.	Story Grammar Units – Story 3B (School-Age Group)	94

CHAPTER 1: INTRODUCTION, REVIEW OF THE LITERATURE AND PURPOSE OF THE STUDY

Introduction

The introduction of bilingual/bicultural programs for deaf students recognizes the role of American Sign Language (ASL) as the first language of the Deaf and a viable language for educational achievement (Johnson, Liddell, & Erting, 1989; Strong, 1988). The use of ASL and English as complementary languages in the educational system provides an opportunity for students to develop competency in both languages. The advent of these programs has necessitated a review of the processes used for assessing the language skills of the deaf children in these programs.

Numerous measurement tools have been developed to assess the language skills of deaf children. Within the realm of standardized assessment tools, there are a number of tests available for the evaluation of English syntax and vocabulary (e.g., Grammatical Analysis of Elicited Language (Moog, Kozak, & Geers, 1983; Moog & Geers, 1979, 1980), Test of Syntactic Ability (Quigley, Steinkamp, Power, & Jones, 1978). Recently, a number of researchers have begun to develop tools to evaluate competence in ASL.

Within the realm of language evaluation, the development of narrative skills has been recognized as an important aspect of linguistic functioning (Lahey, 1988; Hughes, McGillivray, & Schmidek, 1997). Very little research has been done into narrative development in ASL or with deaf children, particularly as it pertains to assessment.

In order to address a void in the area of language assessment of deaf children, an instrument was developed in the present study for eliciting and evaluating narrative samples with deaf children. The purpose of this study was to develop a stimulus consisting of picture stories that could be used to elicit narratives in either ASL or English. A story grammar scoring protocol was developed to score the students' responses. Together the stimulus and the scoring protocol form the Picture Story Language Instrument.

Prior to initiating the development of the Picture Story Language Instrument, a comprehensive review of the literature in a number of relevant areas was undertaken. The relevant information from the review is presented with respect to deaf education, language assessment, and narrative language. While other areas of research impact the basis of this instrument, their relationship is tangential, and as such, they are not expanded upon in this review. For example, the theories of bilingualism are certainly relevant to bilingual/bicultural deaf education; the reader is directed to sources that develop these theories in more detail. Based on this review of relevant information, a number of research questions were presented as the groundwork for the development and validation of the Picture Story Language Instrument.

Following the literature review presented in Chapter 1, the development process for the Picture Story Language Instrument is detailed in Chapter 2. The development of this instrument included validation studies using expert panels, a feasibility study involving Deaf and Hearing adults, and a small-scale pilot study involving deaf children. Chapter 3 presents the methodology for the main study. The

following two chapters include a presentation of the results of the main study using the Picture Story Language Instrument and a discussion of these results respectively.

Review of the Literature

Bilingual/Bicultural Education for Deaf Children: American Sign Language and English

The bilingual/bicultural philosophy for deaf education recognizes American Sign Language (ASL) as the first language of the deaf and as a vehicle for the instruction of English as a second language. Advocates of the bilingual/bicultural philosophy for language development and deaf education point to the historically dismal outcomes of deaf education programs that use an English-only approach. In traditional English-based programs deaf students have consistently fallen behind their hearing peers on measures of academic achievement (Johnson, Liddell, & Erting, 1989; Strong, 1988). A bilingual/bicultural model encourages deaf children to develop ASL as a native language and English, in its written form and in its spoken form if possible, as a second language (for examples, see Cummins & Danesi, 1990; Davies, 1991; Livingston, 1986; Neuroth-Gimbrone & Logiodice, 1992). This model for academic and linguistic development looks to the literature on bilingualism for its theoretical basis (Cummins, 1980, 1988; Drasgow, 1993; Grosjean, 1992).

In the late 1950's, research began into the linguistics of ASL. Through his intensive studies, Stokoe (1960) was able to demonstrate that ASL was indeed a language – that is, it met all of the linguistic criteria necessary to be recognized as such. Subsequent studies have verified Stokoe's findings (as discussed in Klima & Bellugi, 1979 and in Wilbur, 1987). More recently, a strong push has come for the

recognition of ASL as the natural language of the Deaf and for the use of ASL in the education of deaf children (Cummins & Danesi, 1990). Even before research validated ASL as a bona fide language, it was recognized as a vital link for the Deaf community. The social and cultural existence of the Deaf community has always been expressed by and captured in the natural language of the Deaf - American Sign Language (Lane, 1992).

Deaf children with deaf parents have access to ASL as a native language and are exposed to this language in a similar manner to hearing children developing a spoken language. Research has indicated that these children's language and academic skills are equivalent to those of hearing children (Paul & Quigley, 1994). However, 90% of deaf children are born to hearing parents (Meadow, 1980). As most hearing parents are not familiar with sign language, and most deaf children lack the ability to acquire language through the traditional auditory channel, the majority of deaf children do not have access to the linguistic exposure they require to develop language naturally (Meier, 1991). In order for a deaf child to develop skills in ASL, it is necessary for the child to have exposure to that language at as early an age as possible (Johnson et al., 1989).

Emphasizing spoken English as a native language is not a realistic, or desirable, goal for many deaf children. It has been argued that spoken English is not fully accessible to deaf students, and an emphasis on it as a primary mode of communication would therefore restrict their language input (Supalla, 1980). However, Quigley and Kretschmer (1982, p. xi) have asserted "that the primary goal of education for typical, prelingually deaf children should be literacy" in English.

While this claim may be disputed (Livingston, 1986), the importance of English literacy is recognized by deaf and hearing people alike. As English is the majority language in North America, and is the language most often used by the hearing families of deaf children, English literacy is indeed important for the social, academic, and vocational success of deaf individuals (Neuroth-Gimbrone & Logiodice, 1992).

To facilitate mastery of both ASL and English for deaf children, a bilingual approach to language development and education is essential. The acceptance of this philosophy has tremendous impact for deaf students, their families, and educators (Dubé, 1995; Neuroth-Gimbrone & Logiodice, 1992). For educators, it is necessary to re-evaluate both teaching and assessment techniques to accommodate a bilingual approach. Examination of a child's language skills provides an opportunity to explore the child's strengths and challenges in both ASL and English.

Language Assessment of Deaf Children

Over the years, instruments have been developed and standardized for assessing the language skills of deaf children. Comprehensive discussions of tests developed for assessing language and communication skills of deaf children can be found in Rodda and Groves (1987) and Paul and Quigley (1994). Ling (1976), Kretschmer and Kretschmer (1978), and Russell, Quigley, Power, and Jones (1976) have provided considerable information regarding the assessment of English skills in deaf children.

Beyond the use of specific language tests, models for viewing overall communicative competence in deaf individuals have been presented recently (Maxwell, 1997; Yoshinaga-Itano, 1997). These frameworks focus on

communication in multiple modalities (e.g., signed, spoken, written) across linguistic functions. Interactions among conversational partners and across linguistic domains are investigated. While an in-depth discussion of these models is beyond the scope of this current investigation, the larger picture of evaluating communicative competence certainly has relevance to the issue of language assessment.

Assessment of English Skills

Most of the published assessment tools available for deaf and hard of hearing children have been designed to assess English, either in spoken, signed, or written form. The normative samples used for these tests include students involved in education programs with either an oral or total communication philosophy. Paul and Quigley (1994) provide a discussion of normative samples and psychometric properties of tests for deaf and hard of hearing children.

The Grammatical Analysis of Elicited Language (GAEL) series of tests (Moog, Kozak, & Geers, 1983; Moog & Geers, 1979, 1980) was designed to assess grammatical abilities in either spoken or signed English. Similarly, the Test of Expressive Language Abilities (TEXLA) and the Test of Receptive Language Abilities (TERLA) (Bunch, 1981) target the production and comprehension of nouns, pronouns, prepositions, and verb tenses in English. The Test of Syntactic Ability (TSA) (Quigley, Steinkamp, Power, & Jones, 1978) provides an in-depth diagnostic battery of English syntactic structures. The Rhode Island Test of Language Structure (RITLS) (Engen & Engen, 1983) is another test of comprehension of English sentence patterns. Kretschmer and Kretschmer (1978) present a procedure for the analysis of

spontaneous language samples of deaf children, either spoken or written. This analysis procedure examines semantics, syntax, and communicative competence.

Assessment of ASL

The pool of instruments available for assessing ASL is more limited. In the past few years, a number of researchers have begun to develop tools for assessing ASL. These instruments are still in the development phase; none have been made commercially available. All of the instruments discussed below have been developed in the past five years. Psychometric properties for most of these instruments have not yet been made available. Maller, Singleton, Supalla, and Wix (1999) provide a review of some of the instruments currently being developed. The discussion of these instruments provided below is based on the information provided by Maller et al.

The Test Battery for American Sign Language Morphology and Syntax (Supalla et al., in press) is the most comprehensive ASL assessment battery being developed. It was developed specifically for use in linguistic research. The Signed Language Development Checklist (Mounty, 1994), the American Sign Language Assessment Instrument (Hoffmeister, Bahan, Greenwalk, & Cole, 1990; Hoffmeister, 1996), and the Test of ASL (Prinz, Strong, & Kuntz, 1994; Strong & Prinz, 1997) were designed to evaluate lexical and morphological aspects of ASL. In addition, the latter two include some analysis of narrative abilities. The Test of ASL examines grammatical features, story grammar elements, referencing, and role shift in narratives elicited using a wordless picture story.

Other instruments reviewed by Maller et al. (1999) include an adaptation of the MacArthur Communicative Developmental Inventory for ASL (Provine & Reilly,

1995), which is a parent report instrument to evaluate young children's language production and comprehension. The Sign Communication Proficiency Interview (Caccamise & Newell, 1995) examines comprehension and production of ASL through conversation.

Psychometric information is available for the American Sign Language Proficiency Assessment (ASL-PA) (Maller et al., 1999). This instrument uses language samples collected across three discourse settings. The samples are analyzed for eight linguistic structures and an ASL proficiency rating is assigned. Validity and reliability information is provided based on a sample of 80 deaf children ages 6 to 12.

Concerns with the Language Assessment of Deaf Children

Several issues specific to assessing language skills of deaf children have been identified (Paul & Quigley, 1994). A number of bio-demographic factors, including degree, age of onset and etiology of the hearing loss, family background, use of audition and vision, and cultural status, must be considered. In addition, language and mode of communication are foremost considerations for language assessment. It must be established whether the assessment is targeting ASL or English skills. English language assessment may include written, spoken, and signed English. The information to be gathered during the assessment will direct the scope of the evaluation.

Several other issues must be considered when assessing ASL. As discussed above, many of the instruments designed for use with deaf children are English-based tests. These tools may provide relevant information regarding English language skills; however, they are not appropriate for assessing ASL. Consistent with a

bilingual/bicultural approach, many deaf students learn English as a second language, and only in its written form. An assessment of linguistic competence should focus on the primary language of the child.

A second issue with respect to the assessment of ASL for deaf children concerns the abilities of the assessor. As with any language assessment, the person conducting the assessment must be fluent in the language concerned. Many of the instruments currently being developed for the assessment of ASL are designed to be administered by persons who are native users of the language and who have the required knowledge of the linguistics of ASL (Maller et al., 1999; Strong & Prinz, 1997). While this may be possible in some large, urban centers, in many areas this requirement may not be attainable.

Regardless of the circumstances, the person conducting the assessment must, in addition to being fluent in ASL, have an understanding and appreciation of Deaf culture. Kovarsky and Maxwell (1992) cite an example of the danger of having someone conduct an assessment that does not have the required knowledge. They present the case of an individual being assessed by two clinicians. Because the clinicians were unable to understand the person's attempts to convey a story in ASL, the individual simplified his language to single word utterances. Thus, the clinicians erroneously concluded that the individual was at a much lower level of language competency than was actually true. In this case, the validity of the assessment process was compromised because of the clinicians' limited abilities in ASL.

Abraham and Stoker (1988) found that speech-language pathologists are often responsible for the language assessment of deaf or hard of hearing children. Since the

introduction of bilingual/bicultural programs, this responsibility may be shared with an ASL specialist at these centres. Proper training for the person conducting the evaluation is paramount to the assessment procedure.

Many of the issues discussed with regards to bilingual language assessment are relevant in the assessment of deaf children who use ASL and English. The need for an assessment procedure that accurately reflects the communicative abilities of individuals from different linguistic and cultural backgrounds has been well-documented (Damico, 1991; Erickson, 1981). In addition to the usual difficulties associated with validly assessing communication skills, cultural factors add another dimension to the evaluation process with bilingual individuals. Bias in the form of cultural differences and first and second language proficiency may dramatically influence the outcome of an assessment. Cultural implications become even more complex for a deaf individual whose ethnic and cultural background differs from the general population and that of the assessor.

Considerations for Assessment

The *Principles of Fair Student Assessment Practices for Education in Canada* (1993) were developed in an attempt to address considerations for assessment. The section "Assessments Produced External to the Classroom" discusses issues such as developing and selecting methods for assessment, collecting and interpreting assessment information, informing students being assessed and their parents/guardians of the assessment results, and implementing mandated assessment programs. These guidelines deal primarily with the issue of standardized assessment procedures. They provide information for test users concerning the importance of

selecting appropriate tools, the appropriateness of the normative population and the standardization procedures of the instrument in relation to the individual to be assessed, and proper administration of the assessment tool.

The two central psychometric issues relevant for assessment are the reliability and validity of the interpretations made from scores or information yielded by an instrument or approach. In the process of developing an instrument for assessment, evidence supporting the reliability and validity of the interpretations made must be provided. Different approaches for addressing aspects of reliability and validity are presented briefly below, although it should be noted that not all of these approaches are applicable for the current study.

Reliability

The reliability of an assessment instrument refers to the consistency or reproducibility of test scores (Crocker & Algina, 1986). A number of methods are available for gathering information regarding the reliability of the scores gathered from a test administration. Reliability may be evaluated over multiple administrations or by examining the internal consistency of the test scores. All test scores must take into account measurement error. In developing an assessment tool, an effort must be made to minimize the measurement error.

The reliability of an instrument can be evaluated by comparing scores of the same test given on more than one occasion (test-retest reliability). These administrations may be done by the same person (intrarater reliability) or by different persons (interrater reliability). In some cases, two forms of an instrument may be developed. The reliability of these alternate forms can be established by comparing

the scores from each form. In each of these cases, a reliability coefficient (Pearson product moment coefficient) is calculated to estimate the strength of the relationship between the two scores.

Reliability for a test can also be examined based on a single administration of the test by considering the internal consistency of the instrument. This may be accomplished by splitting the test into two halves and calculating the correlation between the halves or by calculating a coefficient alpha based on item variances for each of the items or subtests within the test. A complete discussion of the reliability issues related to test development is presented by Crocker and Algina (1986).

Validity

The issue of validity is central to assessment. That is, are the scores derived from an instrument meaningful and truthful? "The key issues of test validity are the interpretability, relevance, and utility of scores, the import or value implications of scores as a basis for actions, and the functional worth of scores in terms of social consequences of their use" (Messick, 1989, p. 13). Messick suggests an approach for examining validity that incorporates the following aspects: content relevance, content coverage, criterion relatedness, and interpretive meaningfulness. Consequential validation is also an important aspect of the validity process. It is important for both developers and users of tests to be cognizant of the consequences resulting from the use of any testing instrument. Messick provides an in-depth discussion of the issues related to test score validity.

The issue of test score validity is important to consider when assessing deaf children who use ASL and/or English. Scores derived from a test that has been

designed to assess English syntax and has been normed on a sample of deaf children who use only English (signed or spoken) would not be a valid indication of the language abilities of a child who communicates primarily in ASL. Conversely, scores yielded by a test of ASL will not provide information about a child's competence in English.

Language Assessment

Language assessment refers to the process of "describing a child's language behavior for the purpose of identifying a problem, planning intervention, or estimating prognosis" (Lahey, 1988, p. 122). The purpose of assessing language skills is to: determine the level of language functioning of the individual; ascertain if a delay or deviance in language functioning is present; and describe the language abilities of the individual, including strengths and deficits, in order to develop a plan for intervention. Information gathered through the assessment process may be subsequently used for programming and placement decisions.

Lahey (1988) discusses the need to develop a plan for assessment that will provide all of the required information and answer all necessary questions. There are a number of different ways of gathering information for an assessment. The process presented by Lahey will be briefly reviewed here.

Standardized assessment procedures provide a highly structured environment for gathering information. Information collected through standardized tests may be used to compare an individual to others to determine if a problem exists. Standardized language tests generally target a number of discreet elements that are examined in a structured manner. Administration procedures, stimulus items, and

scoring procedures are established a priori and must be followed closely to ensure the validity of the scores obtained from the instrument is not compromised. In addition, the normative sample of the test must be representative of the individual being assessed.

The use of standardized instruments has been called into question based on the highly structured nature of the testing and potential concerns regarding the validity of the information gathered from these tests (Lund & Duchan, 1988; Muma, 1986). Critics of standardized assessment procedures generally favor the use of less structured, naturalistic observations.

Naturalistic assessment approaches utilize language samples gathered in natural contexts. These language samples are then analyzed against taxonomies for different dimensions of language. Numerous procedures for the analysis of language samples have been presented in the literature (for examples, see Bloom & Lahey, 1978; Crystal, Fletcher, & Garman, 1976; Lee, 1974; Lund & Duchan, 1988; Miller, 1981; Tyack & Gottsleben, 1974).

Lahey (1988) suggests supplementing the information gathered through naturalistic observation with specific elicitation tasks. Elicitation tasks can target linguistic structures that require further probing. These tasks involve more structure than naturalistic observation, but are not as highly structured as the standardized test tasks. A naturalistic setting is still used, but the assessor manipulates the situation in an attempt to elicit the desired structures. These probes can provide the basis for intervention planning.

Narrative tasks provide an example of a naturalistic approach that can provide an opportunity to probe specific structures in more depth (Hedberg & Westby, 1993). Storytelling is a common medium used by children in any language and thus provides a natural environment for language sampling. An assessment of narrative skills contributes integral information for a complete language evaluation.

A Model for Language Assessment

An approach to language assessment must provide information that is valid. Narrative analysis has been advocated as a means of gathering information that meets this criterion (Hedberg & Westby, 1993; Hughes, McGillivray, & Schmidek, 1997; Lahey, 1988). A narrative framework allows individuals to use their own language to create a story involving characters, settings, and plots (Bruner, 1986) or to retell a story that they have heard or viewed (Johnston, 1982).

Narrative Language

Narratives are used to convey information about events, either real or fictional. Information is usually presented in temporal order (Heath, 1986; Lahey, 1988). The study of narratives provides valuable information about the development and use of language, both typical and atypical. A number of perspectives for the description and analysis of narratives have been presented (Applebee, 1978; Labov, 1972; Stein & Glenn, 1979). Narrative discourse has been identified as a useful tool in the assessment of language skills of children (Hedberg & Stoel-Gammon, 1986; Hughes et al., 1997; Johnston, 1982; Scott, 1988). The narrative abilities of deaf children have been investigated, and more recently, research into the use of narratives in ASL has begun to emerge.

Narratives of Deaf Children

A few studies over the years have investigated the narratives of deaf children. The majority of these studies focused on written English stories (Sarachan-Deily, 1985; Yoshinaga-Itano & Downey, 1992) or the comprehension of narrative structure (Banks, Gray, Fyfe, & Morris, 1991; Schirmer & Bond, 1990; Schirmer & Winter, 1993). Griffith and her colleagues (Griffith & Ripich, 1988; Griffith, Ripich, & Dastoli, 1990) examined the self-generated and retold narratives of deaf children in a total communication program who used signed English. Story structure, propositions, and cohesion were examined during these studies. The performance of the deaf children in these studies followed a general pattern similar to the pattern observed for non-disabled children and the pattern for children with learning disabilities. These studies indicate that story structure is a viable form of analysis for deaf, signing children.

Narratives in ASL

Limited research is available on the use and structure of narratives in ASL. Most of the available literature in this area deals with adult productions of stories. These studies have focused on structures such as pausing (Gee and Kegl, 1983), eyegaze (Bahan & Supalla, 1995), and lines and stanzas (Wilson, 1996). Emmorey and Reilly (1998) describe a study of ASL narratives involving deaf children with deaf parents. Their study examined the use of direct quotation and reported action in stories. There is no published information available about narrative development in ASL or about macrostructure analysis (e.g., story structure). In the instrument currently being developed for the assessment of ASL, Strong and Prinz (1997) include

an analysis of narrative structures in their evaluation of signed (ASL) narratives. As noted previously, information from this instrument is not yet available.

Story Structure Analysis of Narratives – Story Grammar Model

An examination of story structure is one possibility for macroanalysis of a narrative. Stein and Glenn (1979) presented a model of story grammar commonly used in story structure analysis. "Story grammars are goal-based definitions of stories in which a major character, the protagonist, is motivated to achieve some type of goal-oriented action" (Hedberg & Stoel-Gammon, 1986, p. 64). The seven story grammar components identified by Stein and Glenn (1979) include:

1. Setting (S) – introduction of the main characters and physical environment for the story.
2. Initiating event (IE) – a problem or complication arising in the story which requires the main character to attempt to solve it.
3. Internal response (IR) – the character's feelings or thoughts in response to the initiating event which motivates the character to act.
4. Internal plan (IP) – an idea or plan of the main character to solve the problem.
5. Attempt (A) – an action performed by one of the characters in an attempt to fix the problem.
6. Consequence (C) – an outcome or result of the attempt.
7. Reaction (R) – an action or emotion displayed by the character in response to what has happened.

Stories may or may not include all of these components. At a minimum, an initiating event (or internal plan/response), an attempt, and a consequence are

necessary for a complete episode. A story may consist of one or more episodes of varying levels of complexity (Hedberg & Stoel-Gammon, 1986; Hughes et al., 1997).

A number of schemas have been developed to describe the levels of competence of narratives (Applebee, 1978; Lahey, 1988; Glenn & Stein, 1980). Hughes et al. (1997) present a model of story structure levels that has been compiled from a number of sources. The levels range from descriptive sequence to an interactive episode. Johnson (1995) discusses in detail the developmental nature of narratives, summarizing the literature from a number of sources. In general, the research with hearing children indicates that during the preschool years, children produce stories in the form of sequences; by approximately age six, they can produce some episodic structure; and by approximately age eight, they can produce complete episodes and multiple episodes. Children produce complex and embedded episodes by approximately age eleven (Hughes et al.).

Stein and Glenn's (1979) story grammar model has been used as the basis for analysis in numerous studies, with normally developing children and children with language or learning disabilities (for examples, see Gilmore, Klecan-Aker, & Owen, 1999; Griffith, Ripich, & Dastoli, 1986; Merritt & Liles, 1987, 1989; Schneider, 1996). This model has been found to be one of the most clinically useful tools for analyzing the stories of elementary school-aged children (Hedberg & Stoel-Gammon, 1986). Story grammar analysis has been applied to both oral and written narratives (Apel & Masterson, 1998; Hughes et al., 1997).

Use of Narratives in Assessment

Narrative productions provide a useful vehicle for assessing the language skills of school-aged children (Hedberg & Westby, 1993; Johnson, 1995; Lahey, 1988). Narrative ability has been identified as the single best indicator of later language ability and academic performance for children with language or learning disabilities (Bishop & Edmondson, 1987; Fazio, Naremore, & Connell, 1996). Feagans and Appelbaum (1986) found that narrative abilities were a more accurate predictor for academic achievement than were syntactic or semantic abilities.

The Bus Test (Renfrew, 1980; Cowley & Glasgow, 1991) was the first commercially available test focussing specifically on narrative abilities. This instrument uses story retelling with accompanying pictures. Scoring is based on information units, sentence length, complexity, and independence. More recently, narrative analysis protocols have been presented by Hughes et al. (1997) in their Guide to Narrative Language: Procedures for Assessment and by Strong (1998) in the Strong Narrative Assessment Program (SNAP). These instruments provide an opportunity for a more in-depth narrative assessment.

Story grammar, syntactic form, and cohesion are the most common analyses used for evaluating narratives. Holistic scoring of narratives has also been presented as an alternative (Gillam et al., 1995; Hughes et al., 1997; Hughes, Ratcliff & Lehman, 1998).

Eliciting Narratives

Narratives cover a broad range of discourse that is used in everyday interactions. Factual, fictional, and personal events are relayed through the use of

narratives. In analyzing the stories of children, the method used to elicit the story may largely influence the content and structure of the narrative (Hedberg & Stoel-Gammon, 1986).

Narratives may be spoken or written, or in the case of ASL, signed. Regardless of the modality in which the story is told, the formats available for eliciting stories remain the same. Stories may be original tellings generated by the storyteller or they may be retellings of a story presented to the individual. In the case of self-generated narratives, the stimuli used to elicit the story can range from non-existent to highly structured. Story stems, themes, scripts, props, single pictures, and picture sequences may all be used to elicit stories (Hedberg & Stoel-Gammon, 1986). Themes or props provide a minimal amount of structure for the storyteller. Picture sequences can also be used to elicit self-generated stories. However, more structure is imposed with respect to the length and content of the story. In the case of retold stories, the child is told a story and then asked to retell it. The initial story and the retelling may or may not be supported with visual stimuli (e.g., pictures, video). Story retellings provide more structure as compared to self-generated stories.

Self-generated stories are considered to be more representative of spontaneous language use as compared to retold stories (Liles, 1993). Although self-generated stories have also been found to be shorter in length and to contain less story grammar information and fewer complete episodes as compared to retold stories (Merritt & Liles, 1989). Original stories elicited without props have been found to be more sophisticated and contain more story grammar information than those elicited with props (Nurss & Hough, 1985; Wellhousen, 1993). Merritt and Liles also found that

interrater reliability was lower for self-generated stories (elicited using story stems) as compared to retold stories, although there were pre-established procedures for scoring both types of stories. In an assessment situation, story retellings lend themselves to criterion-referenced evaluation using a pre-established protocol and allow for comprehension testing (Merritt & Liles; Hughes et al., 1997).

Using picture sequences as a stimulus to elicit stories provides an opportunity to establish a certain degree of structure around the length and content of the story, while still allowing the storyteller to formulate an original story. This context meets the criteria discussed above for assessment (e.g., use of pre-established scoring protocol for increased reliability; protocol for comprehension testing). It also provides a greater opportunity to evaluate the storyteller's own language as opposed to the repetition of a story model. It should be noted that some authors have argued that picture stimuli may negatively impact story structure (Apel & Masterson, 1998; Wellhousen, 1993). Stories told from picture stimuli have been noted to contain less scripted story grammar units and more original information as compared to story retellings (Schneider, 1996). However, pictures appear to elicit stories that are characteristic of those stories told by children when they must formulate their own stories. In fact, using picture sequences for self-generated stories, deaf children produced stories that most resembled adult versions, as compared to non-disabled and learning disabled peers (Griffith & Ripich, 1988).

Preparation time has also been investigated as a factor regarding the quantitative nature of narratives. Hughes and Ratcliff (1996) compared narratives produced with no preparation time and those produced after having one minute to

"think about a story". The narratives produced with the wait time contained more communication units (CU's) and had a longer mean length of communication units (MLCU). Allowing individuals to preview the stimulus before creating a story would provide an opportunity to "plan out" the narrative, perhaps resulting in a more complete and cohesive story.

For assessment purposes, a variety of narrative contexts would provide the most revealing information regarding a child's abilities (Apel & Masterson, 1998; Schneider, 1996). An assessment which included story retellings, original construction with no stimuli, and original construction using picture stimuli would provide an in-depth picture of the child's strengths and needs with respect to narrative abilities.

Summary

The introduction of ASL/English bilingual education programs for deaf and hard-of hearing children provides a unique opportunity for these children to develop linguistic and academic competency in both languages. It has also precipitated the need for valid and reliable means to assess language skills for these children. A number of instruments are currently available for the assessment of English morphology and syntax for deaf children. Recently, the development of a number of instruments to assess morphology and syntax in ASL has been undertaken. However, very little research has been done in the assessment of narrative skills of deaf children – in English or in ASL.

An instrument designed specifically for collecting and analyzing narrative samples of deaf children would provide a unique contribution to this area of study.

An instrument designed for use in either ASL or English would be appropriate for use with deaf children without restricting the language applicability. Given the limited language exposure of many deaf children in their early years, it is necessary to assess these children's skills in both ASL and English to determine if delays in their language development exist.

Purpose of the Study

The purpose of this study was to develop a tool for collecting and analyzing narrative stories from deaf children. The instrument developed, the Picture Story Language Instrument (PSLI), consists of picture sequences to elicit stories and a story grammar coding protocol. This tool was intended for use with children who use either ASL or English. A narrative framework of story grammar (Stein & Glenn, 1979) was used to structure the format of the picture stimuli for this assessment tool. Analysis of the narrative stories collected using this tool was completed using a coding protocol developed in accordance with this model.

In order to accomplish the above-mentioned purpose, this study consisted of two phases: the development and pilot testing of the PSLI, and the main study, which was a field test of this instrument with a sample of the population of interest. The purposes of the test development and pilot study phase were to:

1. develop a set of story stimuli to elicit narratives from deaf children;
2. evaluate these picture stimuli for content and construct validity using expert panels and a feasibility study;
3. establish administration procedures through the course of the pilot study; and

4. establish a coding protocol for story structure through expert panels and a feasibility study.

Questions addressed through the course of the main study were:

1. Did the stories consistently elicit the required story grammar elements and episodic structure?
2. Did the 2-episode stories contain more story grammar units than the 1-episode stories? Did the 3-episode stories contain more story grammar units than the 2-episode stories?
3. Was there a difference in the number of story grammar units used by the children at different ages?
4. Was there a difference in the number of story grammar units used by groups of children defined by bio-demographic factors (e.g., gender, maternal signing ability, family deafness)?
5. Did versions "A" and "B" of the picture stories elicit stories that are comparable with respect to the number of story grammar units used (i.e., are the two forms equivalent)?

Questions 1 through 4 provided evidence of content and construct validity. Question 5 addressed the issue of equivalent forms which, if confirmed, could be used to measure change (e.g., pre-test, intervention, post-test).

CHAPTER 2: DEVELOPMENT OF THE PICTURE STORY LANGUAGE INSTRUMENT (PSLI)

Introduction

The purpose of this study was to develop the Picture Story Language Instrument (PSLI), a tool for collecting and analyzing narrative stories from deaf children. A chronological description of the process used to develop this tool is presented in the present chapter. This process included the development and panel validation of the story scripts and picture stimuli, an adult feasibility study, and a pilot study.

Eliciting Narrative Language Samples with Picture Stimuli

Narrative stories may be elicited in a number of ways. The degree of structure imposed on the narrative and the stimulus used will influence the content and structure of the resulting story. A low degree of structure is imposed on a narrative if the storyteller is instructed to create a story independently. These instructions may be the only stimulus provided or a story stem or script may also be given. Scripted narratives involve stories of familiar events. A moderate degree of structure is imposed on a narrative by having the storyteller create a story from a single picture or a sequence of pictures. A higher degree of structure is imposed upon a narrative if the storyteller is asked to retell a story that has been told or shown (Hughes, McGillivray, & Schmidek, 1997). In this case, the oral story may or may not be accompanied by pictures. As well, a videotaped story may be provided as the stimulus.

In all of the situations described above, the content of the narrative will be influenced by contextual factors. The individual's personal experience, the physical

setting, and the audience are factors that will influence all narratives. In addition, stories elicited using pictures will be influenced by the content of the pictures. In the case of story retellings, the structure and content of the stimulus story as well as the content of the pictures or videotape will influence the narratives.

In the present study, picture stimuli were chosen as they provide for a moderate degree of structure in eliciting a narrative language sample. In using a set of pictures developed a priori, the researcher was able to control, to an extent, the external context of the story. This was felt to be important for an instrument that was to be used across a group of children. An additional advantage of presenting pictures without an accompanying story model was that the same picture stimuli could be used for children who use ASL and those who use English without concern for providing models in each language that were linguistically equivalent in content and structural complexity.

Development of the Narrative Stories

Written narratives were developed as models for the picture sequences. Stein and Glenn's (1979) story grammar structure was followed in constructing the model stories for the present study.

Banks, Gray, Fyfe, and Morris (1991) suggest that multi-episode stories provide a more sensitive measure than single episode stories. Multi-episode stories provide an opportunity for increasing complexity in content and structure. For this study, the stories were structured in two equivalent sets (the "A" stories and the "B" stories). This format was chosen to allow for the possibility of alternate administrations. Six stories were constructed: two 1-episode stories (stories 1A and

1B), two 2-episode stories (stories 2A and 2B), and two 3-episode stories (stories 3A and 3B). In addition to increasing the length of the stories, the 2- and 3-episode stories increased in content complexity through changes in the story situations and number and gender of characters. All stories presented a real-time, temporal sequence of events. Story scripts were developed with the details of the structure, length, and complexity of the stories. The scripts were then developed into written narratives with accompanying picture descriptions (see Appendix A). An example of the narratives developed is presented in Table 1.

The 1-episode stories (story 1A and 1B) involved two characters; the 2-episode stories (stories 2A and 2B) involved three characters; and the 3-episode stories (stories 3A and 3B) involved four characters. The "A" stories were set around a swimming pool. The characters in these stories were elephants and a giraffe. The "B" stories were set around a park. The characters were rabbits and a dog.

Table 1

Sample Story: George and Lizzy at the Swimming Pool (1A)

Picture	Sample Story	Story Grammar Elements
1	One day George the Giraffe was at the swimming pool. His friend Lizzy the Elephant was there too. Lizzy was bouncing her ball.	Setting Character 1 (C1) Character 2 (C2)
2	Suddenly, Lizzy's ball fell in the water. George wanted to get the ball for his friend. He decided to jump in the swimming pool.	Initiating Event Internal Response Internal Plan
3	So George jumped in the water. He swam towards to ball.	Attempt
4	George got the ball. He swam to the side of the pool and gave the ball back to Lizzy.	Consequence
5	Lizzy was happy to have her ball back. George was proud that he was able to help his friend.	Reaction (C2) Reaction (C1)

Narrative Panel Validation (Phase 1): Validation of the Written Narratives

The use of expert panels has been proposed as a means of gathering content-related validity evidence (Crocker & Algina, 1986). In order to ensure that the stories conform to the rules of story grammar, a panel of eight experts, referred to as the

narrative panel, was asked to review the stories. The members of this panel judged the stories with respect to conformity to the story grammar model, consistency of narrative structures across the stories, and overall "goodness" of the stories. This was the first phase of the narrative panel review. The same panel also participated in the second phase of the panel review.

The Narrative Panel

Sixteen individuals were identified as potential members for this panel. Potential panelists were identified by reviewing the literature in the area of narrative language and through personal contacts of the dissertation supervisory committee. These individuals were contacted by letter or e-mail to invite them to participate as members of this panel. Of the 16 individuals contacted, nine agreed to participate as members of the panel, but one person subsequently dropped out. Of the individuals who did not agree to participate, six of them indicated time and commitment constraints and one indicated that she did not agree philosophically with the use of the model for this type of a project.

The eight panelists worked as professors or instructors within a Communication Disorders department at a university and all had earned a PhD. There were seven female panelists and one male; six of the panelists taught at American universities, two at Canadian universities. The characteristics of the panel are summarized in Table 2. As shown, all of the panelists had participated in research and clinical activities through the course of their careers. The number of years of experience ranged from 4 to 40 years. All but one of the panelists (number 3) had considerable research and clinical experience with narrative analysis. Panel member

#3 had only used narrative analysis in a teaching setting. Panel member #8 did not participate in phase 1 of the panel review (participated in phase 2 only).

Table 2

Narrative Panel

Panel Member	Current Position	Years of Experience		
		Research/ Teaching	Clinical	Narrative Analysis
1	Assistant Professor	8	7	12
2	Professor	25	40	16
3	Associate Professor	10	13	as part of teaching
4	Associate Professor	18	17	10
5	Professor	20	14	15
6	Assistant Professor	6	4	8
7	Professor	23	24	7
8	Instructor & clinical consulting	12	22	16

Each panel member was sent a copy of the written stories along with a set of questions to answer for each story and a set of general instructions for this phase of the evaluation (see Appendix B). The questions used dichotomous yes/no scoring. All but the last two questions for each story focussed on story grammar structure. The last two questions dealt with episodic structure and numbers of pictures required to illustrate the story respectively. Open comments were also encouraged. Members of the narrative panel reviewed the stories independently. The researcher collated the responses and comments.

Results of the narrative panel evaluation (phase 1). Percentage agreement scores were calculated to determine the extent to which the panel agreed with the original story (see Table 3). A criterion of 80% agreement was originally set as a guideline for accepting the stories as written. Two of the stories (2A and 1B) met the original criterion of 80%. Because the number of panel members was lower than expected, the criterion was used only as a guideline and the narrative comments were examined more closely in order to determine what changes needed to be made.

Table 3

Judges rating of Stories – Narrative Panel Phase 1

Story	Percentage of Agreement[a]
1A	73.5
2A	85.3
3A	68.2
1B	85.7
2B	75.0
3B	72.6

[a] Percentage of "yes" scores indicating agreement with original story

The median score for each item was also calculated and the total score of the absolute deviation from the median was calculated for each rater (see Figure 1). The deviation scores allowed the researcher to consider raters who deviated consistently from the group. Deviation scores ranged from 6 to 21. Panel members #5 (NP5) and #6 (NP6) had the highest deviation scores (18 and 21 respectively). The deviation scores for these two raters were consistent with the rest of the group for stories 1A and 1B, but were higher for the other stories.

The disagreement of these two raters in particular surrounded the issue of episodic structure for the multi-episode stories. Panel member #6 (NP6), for example, suggested that the 2- and 3-episode stories actually contained multiple attempts to solve the same problem. This rater described Story 2A as a single episode story with an embedded episode. These remarks were taken into consideration in the revisions to the stories and an attempt was made to clarify the episodic boundaries.

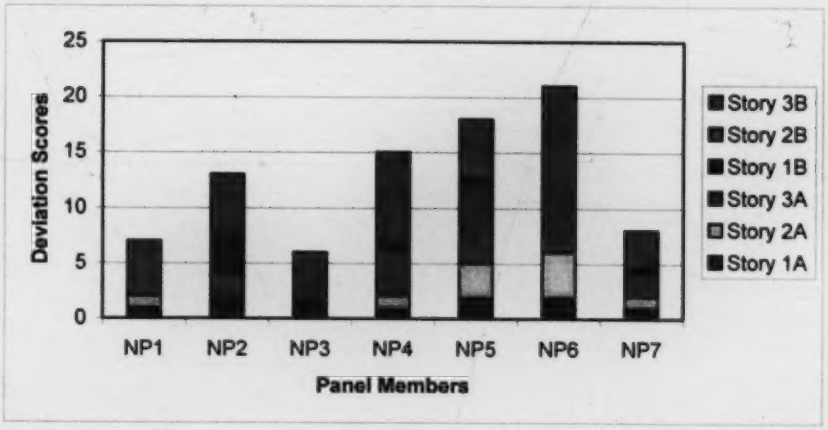

Figure 1. Total absolute deviation scores for the Narrative Panel members for phase 1 of the panel evaluation.

Changes were made to all of the stories, with the most significant change being made to story 1A. Changes were based primarily on the narrative comments provided by the panel members. In addition to changes to the content of the stories, it was decided that the 3-episode stories would be depicted in 13 pictures rather than 11 pictures. Panel members indicated that this would allow for a more accurate depiction of the story grammar elements.

Development of the Picture Sequences

The revised written narratives were sent to an artist to develop line-drawn, black-and-white cartoon picture sequences to illustrate the stories. This artist specialized in animated drawings. His experience included illustrating children's books, designing greeting cards, and writing cartoon strips. The artist was provided with the written narratives as well as guidelines for the content of the picture sequences. He was also instructed to consider the population of interest (i.e., deaf children ranging in age from 5-0 to 10-0 years). The picture stories contain original characters. This was done so that the children would not be biased by previous knowledge of the stories or the characters. The story sequences were designed such that the story grammar structures are represented in the pictures consistently across all stories. The 1-episode stories are depicted in five pictures; the 2-episode stories are depicted in eight pictures; and the 3-episode stories are depicted in 13 pictures. The picture sequences for each story are found in Appendix C. Copyright permission for the use of these pictures for this research project was provided by the artist.

Validation of the Picture Sequences

The validity of the picture sequences was examined along three aspects: (1) the appropriateness of the picture sequences for eliciting the target structures; (2) the appropriateness of the picture sequences for the target population; and (3) the adequacy of the picture sequences for eliciting stories in either ASL or English which adhere to the story grammar model.

Narrative Panel Validation (Phase 2): Appropriateness of the Picture Stimuli for Eliciting the Target Structures

The picture sequences for each story were sent to the same narrative panel that evaluated the written narratives. The members of this panel were asked to judge the adequacy of the picture sequences for eliciting the targeted story grammar structures. Each picture story was sent to the panelists along with a questionnaire containing three questions. The first question, containing six items, used dichotomous yes/no scoring, as did the second question. The first question focussed on story grammar structure; the second question focussed on episodic structure. The final question, which dealt with overall story quality, used a five-point Likert scale (see Appendix D). Open comments were also encouraged. Again, the panelists reviewed the stories independently. The researcher collated the responses and comments.

Results of the narrative panel evaluation (phase 2). Overall, the results of this phase of the panel evaluation were higher than the first phase. All of the stories except story 1B met the preset criterion of 80% agreement for depiction of story grammar elements and episodic structure. In response to the question number 3, "Could children use these pictures to tell a comprehensible story?" four of the stories were rated 5, one of the stories was rated 4, and one story was rated 3 (based on a Likert scale where 1=not at all and 5=very well) (see Table 4).

Scores for story 1B were lower than for the other stories. This was true for the percentage of agreement scores for questions 1 and 2 and for the rating for question 3. Feedback from the panel indicated that the judges felt that the depictions of the initiating event, internal response, and attempt were not completely clear. This issue

was addressed by making changes to the coding protocol based on the panel's feedback.

Table 4

Judges Rating of Picture Stimuli – Narrative Panel (Phase 2)

Story	Percentage of Agreement (Questions 1 & 2)[a]	Median Score (Question 3)[b]
1A	100	5
2A	94.6	4
3A	98.2	5
1B	70.9	3
2B	89.3	5
3B	100	5

[a] Based on percentage of "yes" scores
[b] Based on a 5-point Likert Scale

Deviation scores for this phase of the panel evaluation ranged from 3 to 10 (see Figure 2). The overall deviation scores were lower for this phase of the panel evaluation; however, there were fewer questions as compared to phase 1. Panel member #1 (NP1) had the highest deviation scores. Most of the deviation differences for this rater were based on stories 1B and 2B. In fact, story 1B accounted for 44% of the deviation scores for all of the raters, indicating again that this story, as was illustrated and coded, was problematic.

The feedback provided by the panel members was generally positive. The coding for story 1B was revised and clarified based on the panel members' suggestions. In addition, minor changes were made by the artist to several of the pictures based on the recommendations provided by the panel.

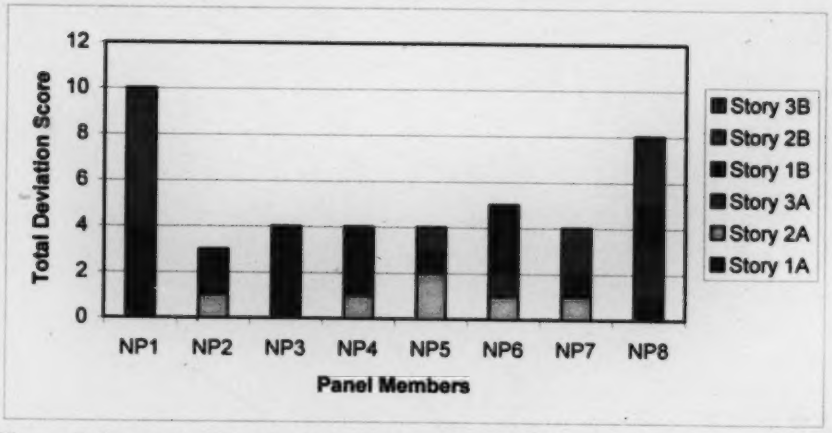

Figure 2. Total absolute deviation scores for the Narrative Panel members for phase 2 of the panel evaluation.

One rater indicated that it was difficult to discern what type of animals the characters were supposed to be (e.g., the giraffe, the dog). However, because the intent of the picture stories was to present characters that were clearly distinct from one another, the researcher was not concerned with whether the children could "correctly" identify the animals. In fact, any label for the character would be considered acceptable, as long as the child discriminated one character from another and was consistent in his or her identification of the characters. One rater indicated that it was difficult to differentiate between the dog and the rabbit in the "B" series of pictures. This issue was addressed during the data collection by analyzing the stories to determine if the subjects confused the two characters.

Deaf Education Panel Validation: Appropriateness of the Picture Stimuli for the Target Population

In order to determine the appropriateness of the picture stimuli for the target population (i.e., deaf children ages 5-0 to 10-0 years), a second panel of experts was

consulted. This panel, referred to as the deaf education panel, was asked to judge the appropriateness of the content and the complexity of the picture sequences in terms of their applicability and appeal for young deaf children. This panel consisted of experts in the area of deaf education.

The deaf education panel. Fifteen individuals were identified as potential members for this panel (seven deaf, eight hearing). Potential panelists were identified through personal contacts of the researcher and a member of the supervisory committee. These individuals were contacted by letter or e-mail to invite them to participate. Of the 15 individuals contacted, ten agreed to participate. Of the ten individuals who agreed to participate, four people did not return the completed questionnaire (two Deaf, two Hearing), despite ongoing follow-up contact by e-mail and telephone. The five individuals who did not agree to participate (four Deaf, one Hearing) either indicated time and commitment constraints or did not respond to the letter and subsequent telephone and e-mail messages. The six panelists who participated in the review worked or had worked at provincial schools for the deaf as teachers (n=5) or as a speech-language pathologist (n=1). Five of the panelists were Hearing (four females and one male) and one was Deaf (male). As is described in Table 5, all of the panelists used English and ASL.

Table 5

Deaf Education Panel

Panel Member	Current Position	Degrees Held	Years of Experience	Languages Used	Deaf/ Hearing
1	Retired teacher	BEd	29	English, ASL	Hearing
2	Teacher	MSc	4	ASL, English (written)	Deaf
3	Teacher	BA, Dip-Ed'n of Deaf	23.5	English, ASL	Hearing
4	Retired teacher	BEd	40	English, Signed English, ASL	Hearing
5	Teacher	MA	23	ASL, English	Hearing
6	PhD Candidate	MSc	12	English, ASL, German	Hearing

Each picture story was sent to the panel members along with a questionnaire designed to elicit the panel's feedback regarding the appropriateness of the picture stimuli for deaf children. The questionnaire contained the following four questions for each story: (a) "Will this picture story be appealing to deaf children?"; (b) "Will deaf children be familiar with the characters of this story?"; (c) "Will deaf children be familiar with the setting of this story?"; and (d) "Could deaf children use these pictures to tell a comprehensible story?".

The questions used a five-point Likert scale (see Appendix E). Open comments were also encouraged. The panelists reviewed the stories independently. The researcher collated the responses and comments.

Results of the deaf education panel evaluation. The median scores for all four questions for each story ranged from 4 to 5 (where 5=very well), indicating that overall the panel felt that the picture stories would be appropriate for young deaf children (see Table 6).

Table 6

Median Scores of Judges Responses – Deaf Education Panel

Story	Question #1	Question #2	Question #3	Question #4
1A	4.5	4.5	4.5	5
2A	5	4.5	5	5
3A	4.5	4	5	5
1B	4	4.5	5	4.5
2B	4.5	5	4.5	4
3B	5	4	5	5

Note. Based on a 5-point Likert Scale

Panel member #1 (DEP1) consistently rated the stories lower than the other raters. This rater also had the highest deviation score (see Figure 3). Panel member #2 (DEP2), who was the only panel member who was Deaf, rated the stories the highest overall. This panel member also suggested that the characters in the pictures looked like they were "talking" rather than "signing". The artist was asked to make several minor changes to the pictures based on the recommendations provided by the

panels. The open-mouth expressions of the characters in the stories were not changed at this point.

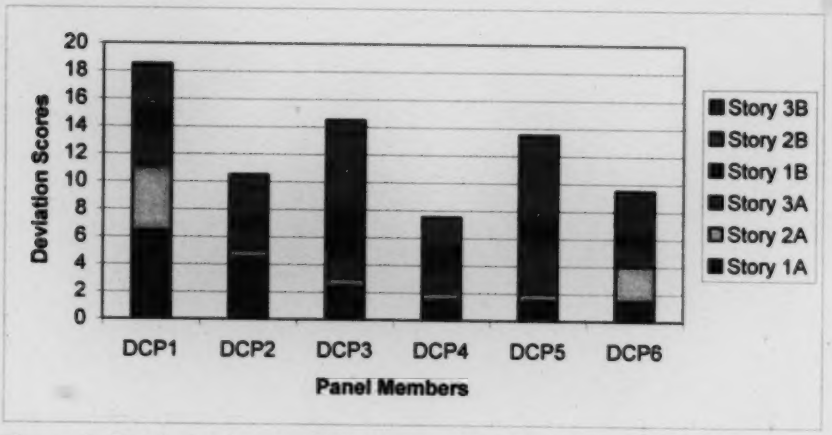

Figure 3. Total absolute deviation scores for the Deaf Education Panel members for the panel evaluation.

In contrast to the Narrative Panel, this panel did not indicate any difficulties with story 1B. However, the narrative panel members did indicate that their concerns with story 1B centered on the coding of the initiating event, attempt, and consequence, rather than the characters, setting, and overall appeal of the story.

Adequacy of the Picture Stimuli for Eliciting Stories

The picture stories were evaluated to determine their adequacy in eliciting "good" stories, that is, stories that contained the required story grammar units and episodic structure. In order to gather information regarding the validity of using these picture stories to elicit stories, a feasibility study was conducted with adult subjects. Adults were chosen for this study because they would be most likely to be able to produce stories that contained all of the required elements. Both Deaf and Hearing subjects were sought in order to analyze stories in ASL and in English. The picture

stories were tested in both languages to ensure that they could elicit "good" stories in both ASL and English. In addition, because there is no information in the literature about the use of story grammar in ASL, the results of this study provided a baseline for the use of this model for analyzing ASL stories.

Adult Feasibility Study

Participants

Six adults participated in this study. As shown in Table 7, three of the adults were Deaf, native ASL users and the remaining three adults were Hearing, native English speakers. The individuals were teachers, former teachers, or teaching assistants. The mean age of the Hearing subjects was 30 years; the mean age of the Deaf subjects was 38.3 years. All of the Hearing subjects listed English as their first language; two of these subjects were bilingual. All of the Deaf subjects listed ASL as their first language and English (written) as their second language.

Table 7

Adult Subjects

Subject	Age	Gender	Hearing Status	Education	Occupation	1st Lang	2nd Lang
A1	32	F	Hearing	BEd	Teacher	English	
A2	27	F	Hearing	BEd	Teacher	English	Danish
A3	31	F	Hearing	BEd, MBA	Consultant/ Former Teacher	English	French
A4	45	F	Deaf	MA	Teacher	ASL	English (Written)
A5	44	M	Deaf	MEd	Teacher/ASL Specialist	ASL	English (Written)
A6	26	F	Deaf	BSc	Teacher Assistant	ASL	English

Procedure

After receiving informed consent, the instrument was administered to each subject either in his/her home (Hearing individuals) or in the school where he/she worked (Deaf individuals). The individuals were provided with the picture stories, one story at a time (see Appendix C). They were asked to review all of the pictures for the story and then create a story from the pictures. They were instructed to tell the stories "as if they were telling them to a group of children." The pictures were available to refer to as they told the stories. All participants were videotaped while telling the stories. The stories were transcribed by the researcher and analyzed for the use of story grammar structures. Participants also completed a brief questionnaire (see Appendix F).

In addition to the storytelling, one of the Deaf individuals was interviewed retrospectively by the researcher. The interview focussed on the nature of storytelling in ASL versus English. A transcription of this interview is found in Appendix G.

Data Transcription and Coding

All stories were transcribed by the researcher. English stories were transcribed into t-units (Hunt, 1965). ASL stories were transcribed following the conventions described by Baker-Shenk and Cokely (1980). All stories were subsequently analyzed for story grammar units and number of complete episodes. A list of story grammar units credited is found in Table 8. For the purpose of this study, a complete episode was credited if it contained either an initiating event, internal plan, or internal response; an attempt; and a consequence (Merritt & Liles, 1989). This more stringent criterion was applied rather than the alternative criterion, which

requires any two of the following: an initiating event, an attempt, and a consequence (Hughes, McGillivray, & Schmidek, 1997).

Table 8

Story Grammar Units Scored

SET	setting
CHAR1	1st character
CHAR2	2nd character
IE, ep1	initiating event, 1st episode
IR, ep1	internal response, 1st episode
IP, ep1	internal plan, 1st episode
ATT, ep1	attempt, 1st episode
C, ep1	consequence, 1st episode
R1, ep1	reaction of the 1st character, 1st episode
R2, ep1	reaction of the 2nd character, 1st episode
CHAR3	3rd character
IE, ep2	initiating event, 2nd episode
IR, ep2	internal response, 2nd episode
IP, ep2	internal plan, 2nd episode
ATT, ep2	attempt, 2nd episode
C, ep2	consequence, 2nd episode
R1, ep2	reaction of the 1st character, 2nd episode
R2, ep2	reaction of the 2nd character, 2nd episode
R3, ep2	reaction of the 3rd character, 2nd episode
CHAR4	4th character
IE, ep3	initiating event, 3rd episode
IR, ep3	internal response, 3rd episode
IP, ep3	internal plan, 3rd episode
ATT, ep3	attempt, 3rd episode
C, ep3	consequence, 3rd episode
R1, ep3	reaction of the 1st character, 3rd episode
R2, ep3	reaction of the 2nd character, 3rd episode
R3, ep3	reaction of the 3rd character, 3rd episode
R4, ep3	reaction of the 4th character, 3rd episode

* for stories 1A and 1B, the elements are listed without reference to episode number

Reliability

Interrater reliability was completed for the transcriptions of the ASL stories and for the coding of the stories. Twenty-five percent of the ASL stories were transcribed by a second rater who was Deaf and a native user of ASL. Point-by-point agreement of sign units was 84% and the agreement for meaning of the utterances was 92.9%. In order to ensure that transcription differences did not result in different scorings, both transcribers' versions of the stories were coded. The reliability for the coding based on these two transcriptions was 94.3%. Thus, although there were some differences in the transcriptions, it can be inferred that the transcription differences did not affect the information conveyed by the storytellers.

Twenty-five percent of all of the stories (ASL and English) were also coded for story grammar by a second rater. This rater was a speech-language pathologist and doctoral student with considerable expertise in this area. Interrater percentage of agreement for story grammar codes was 91.4%.

Data Analysis

The stories told by the Hearing adults were compared to the stories told by the Deaf adults to evaluate if the two groups produced comparable stories with respect to the number of story grammar units used. As well, the results for the whole group were analyzed to determine if the two forms ("A" and "B") were equivalent.

Descriptive statistics are presented for story grammar elements and use of complete episodes. Inferential statistical analysis was not completed for this portion of the study due to the small sample size.

Results

Story grammar and episodic structure. Each of the six subjects produced six narratives for a total of 36 stories. All of the stories contained the appropriate number of episodes, with the exception of story 1B told by subject A5 and story 3B told by subject A4. These stories were each missing one of the required elements (a consequence and an attempt in the second episode, respectively). The total number of story grammar units for each story was consistent across individuals (see Table 9).

Table 9

Number of Story Grammar Units and Episodes – Adult Study

Subject	Total 1A	# of Episodes	Total 2A	# of Episodes	Total 3A	# of Episodes
A1	9	1	17	2	23	3
A2	7	1	15	2	25	3
A3	7	1	18	2	21	3
A4	8	1	14	2	21	3
A5	9	1	16	2	25	3
A6	9	1	16	2	23	3

Subject	Total 1B	# of Episodes	Total 2B	# of Episodes	Total 3B	# of Episodes
A1	10	1	13	2	21	3
A2	9	1	16	2	21	3
A3	10	1	16	2	21	3
A4	9	1	16	2	20	2
A5	7	0	16	2	22	3
A6	10	1	16	2	23	3

All of the individuals provided setting and character elements for all of the stories. As well, each person provided at least one character reaction for each episode in each story. Internal responses and internal plans were used the least consistently:

59.7% of the story episodes included internal responses and only 29.2% of the episodes included internal plans. This result was not considered unusual considering that these elements are often described as "optional" story grammar elements (Hughes et al., 1997). The illustrations in some of the stories may have facilitated the elicitation of these elements more so than for other stories, as there were some episodes within the stories that clearly elicited these elements more than other episodes. For example, story 2A, episode 2; story 3A, episodes 1 and 2; story 1B; and story 3A, episode 1 elicited internal responses from 5 or 6 of the individuals. The remaining episodes elicited internal responses from 3 or less of the individuals. None of the episodes within the stories elicited internal plans from more than half of the individuals.

The mean scores and standard deviations for each story for the Hearing group and the Deaf group were examined (see Table 10). Inferential statistical analysis was not completed due to the small number of subjects. The mean score for the Hearing group was slightly higher for stories 2A and 1B; the mean score for the Deaf group was slightly higher for stories 1A, 2B and 3B; the two groups had the identical mean score for story 3A. The mean total scores for all of the stories for the two groups were similar, although the standard deviation for the Deaf group was larger.

Table 10

Mean Scores and Standard Deviations for the Hearing and Deaf Groups – Adult Study

Story	Hearing Group (n=3) M	Hearing Group (n=3) SD	Deaf Group (n=3) M	Deaf Group (n=3) SD	Mean Difference (Hearing – Deaf)
1A	7.67	1.15	8.67	.58	-1.00
2A	16.67	1.53	15.33	1.15	1.33
3A	23.00	2.00	23.00	2.00	.00
1B	9.67	.58	8.67	1.53	1.00
2B	15.00	1.73	16.00	.00	-1.00
3B	21.00	.00	21.67	1.53	-.67
Total	93.00	.00	93.33	4.73	-.33

Equivalent forms. The stories were also reviewed to evaluate if the "A" set of stories was equivalent to the "B" set of stories. The mean score for story 1A for the group as a whole (Hearing and Deaf individuals combined) was compared with the mean score for story 1B, story 2A was compared with story 2B, and story 3A was compared with story 3B. The mean scores and standard deviations are presented in Table 11. A visual inspection of these scores revealed some differences between the two versions. Story 1B elicited, on average, one more story grammar unit than did story 1A. The average number of story grammar units produced in response to stories 2A and 2B differed by 0.50 units. Story 3A elicited, on average, 1.67 more story grammar units as compared to story 3B.

Table 11

Differences between versions "A" and "B" – Adult Study (All Subjects)

Story	M	SD	Mean Difference (A - B)
1A	8.17	.98	-1.00
1B	9.17	1.17	
2A	16.00	1.41	.50
2B	15.50	1.22	
3A	23.00	1.79	1.67
3B	21.33	1.03	
Total A	47.17	2.48	1.16
Total B	46.00	1.79	

Discussion

The results of this feasibility study provided evidence that the picture stories were valid stimuli for eliciting "good" stories, in both English and ASL, with respect to the story grammar model. The number of story grammar units provided in the stories was similar for the Hearing and the Deaf groups. The stories told in English and in ASL did not vary considerably in their content. Some differences were noted among stories in their identification of the characters. Two of the individuals identified the male character in the "A" series of stories as a horse rather than a giraffe. One of the Hearing individuals referred to both of the main characters in the "B" series as males. It was interesting to note that the Hearing subjects all gave the characters names, while the Deaf subjects referred to the characters by a more generic

label (e.g., dog, rabbit, doctor, lifeguard). This phenomenon was discussed with subject A5 during the retrospective protocol analysis. He indicated that, as a Deaf person, he would label a character based on the physical appearances rather than assigning a "name", which generally has more auditory relevance. In reviewing the names assigned to the characters by the Hearing subjects, most were auditory alliterations (e.g., Harry the Horse, Betty Beagle, Eleanor the Elephant).

A possible issue, which was not investigated during this study, but may be investigated in a future study, is whether the adults compensated for deficiencies in the story stimuli. That is, did the adults, because of their experience and proficiency in storytelling, add the required details to make a "good" story even if the stimuli did not present these elements? This issue could be investigated using a retrospective protocol analysis procedure.

The parallelism of the two stories could not be tested due to the small number of participants in this portion of the study. The mean scores of the two versions of the stories did differ slightly. This issue was pursued in more depth during the main study that included more participants.

A composite list of story grammar codes was compiled based on the original stories as well as the results of the adult feasibility study (see Appendix H). This master list was used as the scoring protocol for the pilot study, discussed next, and main study of this project, discussed in the next chapter.

Pilot Study

The picture stories were administered to a small sample of deaf children. The purpose of this pilot study was to determine the appropriateness of the picture stimuli

for collecting narrative information from children and to test administration procedures.

Participants

A sample of four children was recruited for the pilot study. Two 5-year old children and two 10-year old children were solicited. The lower and upper boundaries of the target age-range were chosen to determine if the stimuli were appropriate for younger and older children. The Metropolitan Toronto Catholic School Board agreed to participate in this pilot study. Four children who attended the Deaf and Hard of Hearing Program at St. Monica Catholic School in Toronto were recommended for this study by their teachers. The program for Deaf and Hard of Hearing children at this school consists of several self-contained classes, each taught by a teacher of the deaf and hard of hearing. A Total Communication model is used in this program. The teacher for the grade one class was Hearing; the teacher for the grade four class was Deaf. The program was housed within a regular elementary school. This program and the school serve a culturally diverse segment of the city's population.

All four of the children were prelingually deafened and came from homes where they were the only person with a hearing impairment. All of the families reported using minimal sign language at home. English was the second language for three of the four families. Table 12 describes the subjects.

The parent consent and a child's consent forms for participation in this study are found in Appendix I.

Table 12

Subjects for the Pilot Study

Subject	Age	Gender	Grade	Hearing Level	1st Lang[a]	2nd Lang	3rd Lang
B1	9,11	F	4	Profound	Filipino	English	ASL
B2	9,1	M	4	Severe/profound	Spanish	English	ASL
B3	5,9	M	1	Severe/profound	Fanti	English	ASL
B4	6,1	M	1	Profound	English	ASL	

[a] language use as reported by parents

Materials

Data was collected from each subject using the following: Picture Story Language Instrument (PSLI), the Test of Nonverbal Intelligence (TONI-2) (Brown, Sherbenou, & Johnsen, 1990), a teacher rating form, and a parent/family questionnaire.

Picture Story Language Instrument (PSLI)

The PSLI refers to the set of picture stories developed for this study. It consists of the six picture stories used to elicit narrative language. The picture stories are found in Appendix C. Guidelines for administration procedures are found in Appendix J.

These stories were scored using the coding protocol developed from the original stories and the adult feasibility study (see Appendix H).

Test of Nonverbal Intelligence-2 (TONI-2) (Brown, Sherbenou, & Johnsen, 1990)

The purpose of administering the TONI-2 was to obtain descriptive information regarding nonverbal intelligence (as measured by this instrument) for the four students.

The TONI-2 is described by its authors as a "language free measure of cognitive ability" (Brown, Sherbenou, & Johnsen, 1990, p. 1). This instrument uses abstract/figural diagrams in its 55 items. The administrator is instructed to pantomime the instructions. This test was normed on a sample of deaf children. Its validity with this population has been established in an independent study (Mackinson, Leigh, Blennerhassett, & Anthony, 1997). A description of the tasks involved in this test and a summary of its psychometric properties may be found in Appendix K.

Teacher Ratings

The classroom teacher for each subject was asked to rate the children with regards to their language proficiency. The teacher ratings were gathered as a means of obtaining information about the child's language performance in the classroom. Ratings focus on overall language competence in ASL and written, signed, and spoken English (see Appendix L). The Teacher Rating form was developed for the purpose of this study.

Parent/Family Questionnaire

Information regarding the child's audiological and educational history, family composition, history of deafness, language use, and parental education and occupation was gathered from the parents by means of a parent/family questionnaire that was distributed with the parental consent form. This form was developed for use specifically in this study. The parent of one child chose to complete the questionnaire through an interview with the researcher; the other parents completed the form independently. Appendix M contains the questionnaire.

Procedure

Each child was interviewed individually by the researcher. Data for each child was collected in a single session, lasting approximately 45 minutes. Interviews were held in a small room adjacent to a classroom within the school. The children were familiar with the room. In each case, the classroom teacher introduced the researcher to the subject. After a brief time in the classroom, the child accompanied the researcher to the testing room. The room was set up with a table and two chairs. A videocamera on a tripod was set up on the far side of the room. An 8-mm Sony Camcorder was used. The older children were seated in the chairs. For the younger children, the table and chairs were not used as they were too large and obstructed the child's signing space from the video camera.

The purpose of the study was explained to the subject. The older children were asked to read and sign the Child's Consent Form (see Appendix I). The picture stories were then administered. The children were presented the picture stories one at a time. Series A was presented first to subjects B1 and B4; series B was presented first to subjects B2 and B3. The stories within each series were presented in increasing order of number of episodes (e.g., 1A, 2A, 3A; 1B, 2B, 3B). The pictures for each story were spread out in front of the children in order. The children were instructed to first review all of the pictures and then tell a story from them. They were also told that they could refer to the pictures while telling their story. Following completion of the story telling, the children were asked to give their opinion about the task. The story tellings and the discussions were videotaped. Subsequently, the TONI-2 was administered by the researcher. This was not videotaped.

Data Analysis

The researcher used the procedures outlined by Baker and Cokely (1980) to transcribe the narrative stories. This transcription system uses English glosses for signs combined with a system of transcription symbols. The authors of this system also suggest that English structural equivalents and translations be provided.

The transcribed stories were analyzed for story grammar elements and episodic structure using the story grammar protocol (see Appendix H). Descriptive statistics are presented for the story grammar elements. Inferential statistical analysis was not completed on these figures due to the small sample size in this pilot study.

Reliability

Interrater reliability was completed on 25% of the stories for transcription. The second rater for the transcriptions of the stories was a Deaf, native ASL user. Point-by-point agreement of sign units was 78.0% and the agreement for meaning of the utterances was 76.3%. In order to ensure that transcription differences did not result in different scorings, both transcribers' versions of the stories were coded. The reliability for the coding based on these two transcriptions was 89.7%. Thus, although there were some differences in the transcriptions, since they were coded similarly, it can be inferred that the transcription differences did not affect the information conveyed by the storytellers.

Results

The older children (B1 and B2) consistently used more story grammar elements than the younger children (B3 and B4) (see Figure 4). The one exception was story 1B told by subject B2. In addition, the grade four students generally

increased the number of story grammar elements as the stories increased in length and complexity. The grade one students did not consistently show this same trend.

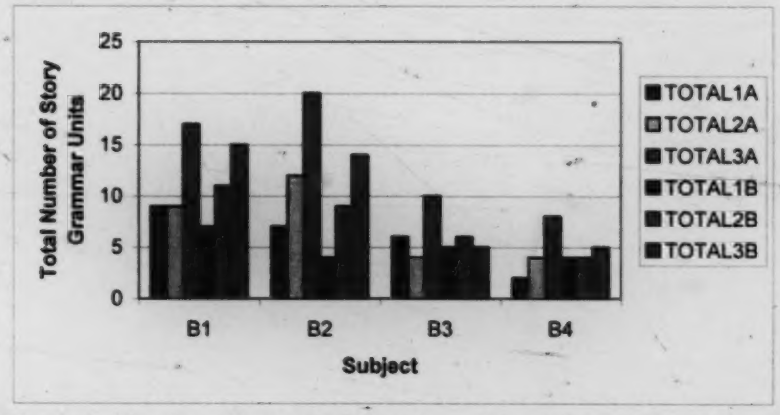

Figure 4. Number of story grammar elements used by the four children in the pilot study.

Overall, the children did not consistently produce complete episodes in their stories. The grade four students produced more complete episodes than did the younger students. Only for stories 1A and 3A did the older students produce all of the expected episodes (see Table 13).

Table 13

Number of Complete Episodes – Pilot Study

Subject	1A	2A	3A	1B	2B	3B
B1	1	1	3	0	0	1
B2	1	0	3	0	0	1
B3	1	0	0	0	0	0
B4	0	0	0	0	0	0

The results of the story grammar analysis were compared to other data available for each child. The TONI-2 scores for the students varied. The older students' scores both fell within one standard deviation of the mean for this test (see Table 14). The story grammar scores for these two students were similar (68 and 66). For the younger students, subject B3 consistently outperformed subject B4 on all measures (i.e., story grammar score on PSLI, TONI-2, Teacher Rating of written English). The teachers rated all four of the subjects the same on their ASL proficiency (i.e., each of the students received a score of 4, which was the highest possible rating). This score was a subjective rating provided by the teacher based on personal experience with the student and with other students.

Table 14

Pilot Study Results – All Measures

Subject	Grade	TONI-2 Quotient[a]	Total-Story Grammar	TR-ASL[b]	TR-Written English
B1	4	92	68	3	2
B2	4	105	66	3	1
B3	1	111	36	3	4
B4	1	61	27	3	2

[a] mean = 100; standard deviation +/- 15 (scores based on hearing norms)
[b] TR – Teacher Rating

Discussion

The results of this pilot study indicate that the older children consistently used more story grammar elements in their stories as compared to the younger children. As well, for the older children, the number of story grammar elements used increased with the length of the story. While this was somewhat true for the younger children, it

was less consistent. With one exception (story 1A, child B3), the stories produced by the younger children did not contain complete episodes (a complete episode being defined as having an initiating event (or internal response or plan), an attempt, and a consequence). The older children produced complete episodes inconsistently. They produced all of the episodes for stories 1A and 3A, along with a few other instances of complete episodes. The remainder of the stories contained incomplete episodes or no episodic structure for all four of the children. This finding would be consistent with episodic use reported with hearing children of the same age (Hughes, McGillivray, & Schmidek, 1997). The use of complete episodes emerges at approximately 8-years of age for hearing children.

The language used in the stories was judged to be consistent with the language use noted during peer interactions and discussion with the researcher. The teacher's ratings of the children's ASL skills indicated that all of the children would fall into the second quartile as compared to other students taught by the same teacher. However, in the stories collected for this study, the language level exhibited, particularly for the younger children, was lower than would be expected for a child of this age (based on this researcher's personal experience). It may be the case that the story grammar analysis used for this study may not be appropriate for children at this language level, as it did not reveal much information about the children. In contrast, the older children responded to the story stimuli in a way that was more consistent with what would be expected (e.g., increasing number of story grammar elements with stories of increasing length and complexity).

The Teacher Rating form completed by the classroom teachers for the four students appeared to be somewhat problematic. The two teachers rated all of the students comparably and favorably on the ASL scale. Yet the students were quite varied in their skills in this area. It may be that the rating scale, as developed, is not sensitive enough to recognize these differences. The scale requires a subjective judgement from the teachers regarding the students' abilities. The teachers' scorings may be a reflection of the fact that both of the teachers were relatively new to the field and to the school. It was decided that this form continued to be used for the main study, but that feedback from the teachers be gathered with regards to the appropriateness of this rating form.

It is difficult to generalize the results of this pilot study beyond the current sample. The linguistic and cultural backgrounds of all of the children were very diverse. Three of the four children in this group came from families where English was not the first language of the family. None of the families used ASL as a first language. Parent reports of their own proficiency in sign language was average to few signs. Thus, these children were not exposed to consistent sign language models at home. The main purpose of this pilot study was to determine if the stimuli and the method of administration were suitable for this subject group. All of the children were able to respond to the demands of the task and the stimuli were deemed appropriate. However, as a result of this study, the method of presentation of the stories was changed. The format of laying out all of the pictures in front of the child was found to be too cumbersome, particularly for the longer stories, which included 13 pictures. Consequently, the pictures were bound into a booklet format (each story

in a separate book) for future studies in an effort to provide an easier way to view the pictures. The booklets would also allow the children to focus on a single picture at a time rather than jumping from picture to picture.

CHAPTER 3: METHODOLOGY FOR THE MAIN STUDY

Introduction

In the previous chapter the development, panel evaluations, feasibility study, and pilot study of the Picture Story Language Instrument (PSLI) were described. The application of this instrument with a larger sample of the population of interest is described in the present chapter. The purpose of this portion of the research program was to determine the appropriateness of the PSLI for collecting narrative information. Information gathered during this portion of the study was used to assess the validity of the scores yielded by this instrument, and to identify needed changes for the instrument.

The questions addressed during the course of this part of the study and the rationale for each question were:

1. *Did the stories consistently elicit the required story grammar elements and episodic structure?*

That is, did the stories allow an opportunity for the examinees to produce all of the elements necessary for a "good" story? This question addressed the content representativeness and relevance of the story stimuli.

2. *Did the 2-episode stories contain more story grammar units than the 1-episode stories? Did the 3-episode stories contain more story grammar units than the 2-episode stories?*

The stories were designed to be hierarchical in length and complexity. It was predicted that the higher level stories would elicit more information than the lower

level stories. Differentiation between the levels of the story would provide added evidence of the construct validity of the PSLI.

3. *Was there a difference in the number of story grammar units used by the children at different ages?*

It was predicted that the older children would produce more story grammar units than would the younger students. This prediction was based on the belief that narrative acquisition, as measured by this schema, is developmental in nature (Glenn & Stein, 1980). Confirmation of this hypothesis would provide confirmatory evidence of the construct validity of this measure.

4. *Was there a difference in the number of story grammar units used by groups of children defined by bio-demographic factors (e.g., gender, maternal signing ability, family deafness)?*

As further evidence of construct validity, within group differences were explored. It was predicted that there would be no difference based on gender of the children. However, it was predicted that maternal signing ability and family history of deafness would be related to outcome scores (that is, that children whose mothers are better signers and those who have family members who are also deaf would score higher than those children whose mothers are poorer signers or who did not have other family members who are deaf).

5. *Did versions "A" and "B" of the picture stories elicit stories that were comparable with respect to the number of story grammar units used (i.e., were the two forms equivalent)?*

The two forms of the PSLI were designed to elicit comparable information, thus providing a means of assessing change. It was predicted that the two forms would elicit scores that did not differ statistically and that were highly correlated.

Population of Interest

The population of interest included deaf children who communicate in ASL, English, or both languages. In the present study, the population included deaf children ranging in age from 4-0 to 11-0 years of age. Quigley and Paul (1989) discuss several characteristics that have been found to influence language competence for this population. These variables include:

- family hearing status (i.e., hearing, deaf or hard-of-hearing)
- parents proficiency in signing
- educational placement and philosophy (i.e., language and mode of communication)
- degree of hearing loss (i.e., audiometric measures)
- age of onset of hearing loss (i.e., prelingual or postlingual)
- socioeconomic status
- IQ

Due to the low incidence of this population, the group was not stratified a priori with regards to these (or other) potentially relevant characteristics. However, gender, maternal signing ability and family deafness were examined in post hoc analysis. Gender was chosen as a post-hoc comparison variable to investigate potential within-group differences. Maternal signing ability and family deafness were chosen because it was postulated that these factors would be related to outcome

scores. In addition, the group was described in terms of hearing status and a measure of nonverbal IQ.

Proposed Sample

In the initial proposal for this study, this phase of the project was to include two separate studies. A sample of 12 children was to be involved in the proposed second pilot study (the first pilot study is described in Chapter 2). A sample of 40 children was to be involved in the main portion of the study.

Pilot Study #2 (Proposed)

A purposive sample of children was recruited for a second pilot study. The purpose of this study was to determine the adequacy of the PSLI for eliciting information from children who were low-to-average achieving students. Four children in the lower age-range of the target population (e.g., 5 year olds), four children in the middle age-range of the target population (e.g., 7 year olds), and four children and the upper age-range of the target population (e.g., 10 year olds) were involved. Subjects were to be recruited based on teacher recommendations of students who are low-to-average achievers. Low-to-average achieving students were to be sought for the second pilot study to determine if the difficulty level of the tasks involved in the PSLI were appropriate for these students.

Main Study (Proposed)

A sample of 40 children, ages 5 to 10, was to be recruited for the pilot study. Eight children for each age grouping were to be selected (i.e., 5-0 to 5-11; 6-0 to 6-11; 7-0 to 7-11; 8-0 to 8-11; 9-0 to 9-11). Sites in Edmonton and Toronto were

approached for subjects. All students within the appropriate age range were to be included in the study (pending parental permission).

Difficulties with Recruitment of Participants

Due to the difficulty in recruiting participants for the study, the sample collected differed from that proposed for the second pilot study. Subjects were solicited only from self-contained programs for deaf and hard of hearing students in order to obtain a sample of children who were educated in a bilingual ASL/English environment. Several of the residential programs in the geographical region where the researcher was located declined to participate in the study (these institutions were conducting their own programs of research at the time). As a result, the provincial school for the deaf in British Columbia was also approached to participate in the study. A second factor that led to the reduced number of participants was that the number of students available at each of the programs was less than was expected at the outset of this project.

As a result of the reduced accessibility to participants, a decision was made to combine the subjects from the second pilot study with the subjects from the main study. Thus, the second pilot study was not conducted as originally proposed. Although the second pilot study had aimed to recruit low-to-average achieving students, all students from the participating agency were included due to the small number of students at that school. Therefore, the participants in that study did not differ from the participants in the main study. The study sample of participants, described below, includes the 12 children recruited for the second pilot study and the 27 students recruited for the main study.

Participants

A sample of 39 children was involved in this study. The children were from a number of different programs for Deaf and Hard of Hearing students: Sir James Whitney School for the Deaf in Belleville, ON (n=12); Provincial School for the Deaf (Jericho Program) in Burnaby, BC (n=15); Alberta School for the Deaf in Edmonton, AB (n=11); Connect Society: DEAF Services in Edmonton, AB (n=1). Appendix N contains a description of each of these programs. Appendix O describes the participants in detail. Information about the children was gathered from the parent/family questionnaires and audiological records provided by the schools.

Relevant Bio-Demographic Features of the Group

Age

The children ranged in age from 4 to 11 years. The mean age of the children was 8.34 years (SD 1.73). As is shown in Table 15, the distribution of children across the age groupings was inconsistent. As well, the distribution of the ages of the children differed from the proposed distribution. As the number of children at several of the age groups was quite small, it was considered that it might be necessary to redefine the age groupings by collapsing ages. The grouping of children by ages is discussed further in the Results section in Chapter 4.

Table 15 Distribution of Children by Age – Main Study

AGE[a]	4,0-4,11	5,0-5,11	6,0-6,11	7,0-7,11	8,0-8,11	9,0-9,11	10,0-10,11	11,0-11,11
n	2	2	3	11	5	6	9	1

[a] age in years, months

Hearing and Language Status

The distribution of children by hearing status, use of hearing aids, and family language is described in Table 16. All but three of the children had a profound or severe-to-profound hearing loss bilaterally. A majority of the children (n=25) did not use hearing aids during testing for this study. These students indicated that they do not normally use hearing aids. Thirteen of the students used their hearing aids and one student was fitted with a cochlear implant. The majority of the children came from homes where English was the first language (n=30) and where they were the only deaf person in the family (n=26).

Table 16

Audiological and Deafness Characteristics of the Children

Hearing Loss	Use of Hearing Aids During Testing	First Language at Home	Family Deafness
Profound-22[a]	Used at least 1 hearing aid–13	ASL–3	One or both parents deaf–5
Severe-Profound–14	Cochlear Implant–1	English–30	Deaf sibling–8
Severe–1	Unaided–25	Other Language–6	Only deaf person in family–26
Moderate-Severe–1			
Mild-Moderate–1			

[a] indicates number of children

The children who participated in this study varied in terms of their abilities in ASL and English. All of the children were exposed to ASL and written English in

their school environments. Their exposure to spoken English varied depending upon their audiological ability and speech training. All but two of the children chose to use ASL to complete the storytelling task (one student used spoken English, one used simultaneous speech and sign). However, for the children who used ASL, their level of competence with the language varied. No other formal measures of language functioning were administered during this study. The classroom teachers for each student completed the Teacher Rating Forms. However, several teachers indicated that they had difficulty with the subjective nature of this measure and were unsure about the gradations for rating students. As a result, this information was not included in any of the analyses for this study.

Gender

Twenty-four of the children were male (mean age 8.25, SD 1.80) and 15 of the children were female (mean age 7.33, SD 1.68).

Maternal Signing Ability

Maternal signing ability was measured by parent report. Parents were asked to rate their signing ability on a five-point Likert scale as no signing, few signs, average, good, or fluent. These categories were collapsed into two groups: (1) – none to average, (2) – good to fluent. Twenty-two of the mothers rated themselves as none to average; 16 of the mothers rated themselves as good to fluent signers. For almost all of the parents, ASL was listed as the sign language used; two of the families indicated that they used a form of sign supported English at home. Of the group 1 mothers (none-to-average signers), 5 had deaf daughters and 17 had deaf sons; of the group 2 mothers (good-to-fluent signers), 10 had deaf daughters and 6 had deaf sons. The

mean age of the children with group 1 mothers was 8.00 (SD 1.83); the mean age of the children with group 2 mothers was 7.69 (SD 1.85).

Family Deafness

Thirteen of the children had immediate family members who were also deaf. Five of the children had one or both parents who were deaf and one child had both parents who were hard of hearing. The remaining seven children with deaf family members had siblings who were also deaf. Twenty-six of the children in this study came from families where they were the only deaf person.

Consent and Ethics

The parent consent and a child's consent forms for participation in this study are found in Appendix I.

Ethics approval for this study was obtained through the ethics committee of the Faculty of Rehabilitation Medicine at the University of Alberta. In addition, approval was obtained from each of the participating schools. Parental consent was obtained for each child. Child consent was obtained from each child immediately prior to data collection (verbal consent for children under the age of eight, written consent for children eight years and older). Participation in this study was voluntary and parents and/or children had the right to refuse participation at any time.

Materials

Data was collected from each child using the Picture Story Language Instrument (PSLI), the Test of Nonverbal Intelligence-2 (TONI-2) (Brown, Sherbenou, & Johnsen, 1990), the teacher rating form, and the parent/family questionnaire.

Picture Story Language Instrument (PSLI)

The PSLI refers to the picture stories and the coding protocol developed for this study. It consists of the six picture stories used to elicit narrative language. The picture stories are found in Appendix C. Guidelines for administration procedures are found in Appendix J.

These stories were scored using the coding protocol developed from the original stories and the adult feasibility study (see Appendix H).

Test of Nonverbal Intelligence-2 (TONI-2) (Brown, Sherbenou, & Johnsen, 1990)

This instrument was described in Chapter 2. A description of the tasks involved in this test and a summary of its psychometric properties may be found in Appendix K.

Teacher Ratings

This form was described in Chapter 2. A copy of the form is found in Appendix L.

Parent/Family Questionnaire

Information regarding the child's audiological and educational history, family composition, history of deafness, language use, and parental education and occupation was gathered from the parents by means of a parent/family questionnaire that was distributed with the parental consent form. This form was developed for use specifically in this study. It was also used in the pilot study. The parents of three of the children completed the questionnaire through a telephone/TTY interview with the researcher; the other parents completed the form independently. Appendix M contains the questionnaire.

Procedure

Each child was interviewed individually by the researcher. Data for each child was collected in a single session, lasting approximately 45 minutes. Interviews were held in a small room within the school. In each case, the classroom teacher introduced the researcher to the student. After a brief time in the classroom, the child accompanied the researcher to the testing room. The room was set up with a table and two chairs. A videocamera on a tripod was set up on the far side of the room. An 8-mm Sony Camcorder was used. The students were seated in a chair, with the researcher seated across from them.

The purpose of the study was explained to the child. The older children (8-years old and above) were asked to read and sign the Child's Consent Form (see Appendix I). The picture stories were then administered. The children were presented one picture story at a time. Series A was presented first to the odd-numbered subjects; series B was presented first to even-numbered subjects. The stories within each series were presented in increasing order of episodes (e.g., 1A, 2A, 3A; 1B, 2B, 3B). The picture stories were presented in booklet form. The children were instructed to first review all of the pictures and then tell a story from them. They were also told that they could refer to the pictures while telling their story. The storytellings were videotaped. Subsequently, the researcher, using the administration procedures described in the test manual, administered the TONI-2. This testing was not videotaped.

Data

With one exception (child #33), six stories were produced by each of the 39 children; child #33 provided five stories. Hence, the total number of stories was 233.

Story Transcription

Each story was transcribed from the videotape to a written form. The researcher used the procedures outlined by Baker and Cokely (1980) to transcribe the narrative stories in ASL. This transcription system uses English glosses for signs combined with a system of transcription symbols. The authors also suggest that English structural equivalents and translations be provided. For the one child who chose to use spoken English to tell his stories, the stories were transcribed orthographically in standard English, segmented into t-units (Hunt, 1965). For children who used simultaneous signed/spoken communication, the ASL transcription procedures were followed and the spoken English text was transcribed along with the signs.

Story Grammar Coding

The transcribed stories were analyzed for story grammar elements and episodic structure using the story grammar protocol (see Appendix H). The list of the codes used is found in Table 8 (p. 43). The coding system used for this study differs slightly from conventional story grammar analysis. Firstly, the setting code has been further expanded to include reference to each character (the CHAR codes). In addition, a reaction code was scored for each character in each episode (the R codes). Episodic structure was scored as complete or incomplete, using the same criteria as described in Chapter 2.

Interrater Reliability

Interrater reliability was assessed for the transcription and for the coding of the stories. Because there was no single person available who was familiar with ASL transcription and with the story grammar coding, different raters completed the two different tasks. Interrater agreement was assessed on a random sample of 25% of the stories for transcription and coding.

The second rater for the transcriptions of the stories was a Deaf, native ASL user. This person received training with regards to the transcription procedures (Baker & Cokely, 1980). Transcription ratings were based on point-by-point agreement. Agreement of sign units was 78.7% and the agreement for meaning of the utterances was 81.7%. In order to ensure that transcription differences did not result in different coding scores, both transcribers' versions of the stories were coded by the first researcher and by the second coding rater. The reliability for the coding based on these two transcriptions was 90.7% and 92.0% for the two raters respectively. Thus, although there were some differences in the transcriptions, since they were coded similarly, it can be inferred that the transcription differences did not affect the information conveyed by the storytellers.

Twenty-five percent of all of the stories were also coded for story grammar by a different second rater. The second rater for the story grammar coding of the transcripts was a speech-language pathologist and doctoral student with considerable expertise in this area. Interrater percentage of agreement for story grammar codes was 87.8%. One source of systematic error was discovered in that the second rater frequently omitted the character codes. This error may have occurred as this

distinction in coding the characters separately from the setting is unique to this study and not generally used in story grammar analysis. Correcting for this systematic error resulted in interrater agreement of 90.1%. Through discussion between the two raters, almost all of the differences were resolved and an agreement of 98.3% was reached.

Data Analysis

The data analyses employed in this study are described in the next chapter together with the results yielded from the analyses. All analyses (descriptive and inferential) were completed using SPSS for Windows 8.0.0 (1997). For most of the inferential analyses, an alpha level of .05 was set as the criterion for significance. However, for analyses that were conducted to determine if groups/data sets were equivalent (e.g., equivalent forms, gender of the group) an alpha of .20 was used. The more liberal alpha of .20 was used for these analyses to decrease the possibility of a Type II error which, if committed, would lead to the erroneous conclusion that the two groups were equivalent when in fact they were not. For analyses that involved the use of multiple comparisons, the alpha level (.05) was divided by the number of comparisons. This more conservative alpha was used to deal with possible spurious Type I errors.

CHAPTER 4: RESULTS OF THE MAIN STUDY

The data analysis and the results of this analysis for the main study are presented in Chapter 4. Prior to presenting these results, the scores for the Test of Nonverbal Intelligence-2 (TONI-2) (Brown, Sherbenou, & Johnsen, 1990) are presented for the group of children as a whole.

Results of the Test of Nonverbal Intelligence-2 (TONI-2)

The TONI-2 (Brown et al., 1990) was administered by the researcher to each child in order to obtain descriptive information regarding nonverbal intelligence (as measured by this instrument) for the group. The standardized administration procedures outlined in the manual were followed (Brown et al.).

The mean TONI-2 quotient score for the group of 36 children who completed the TONI-2 was 100.39, with a standard deviation of 15.78. The values are essentially the same as the corresponding values for the normative sample (100; 15). Three of the children did not complete this test; two (both 4 years old) were below the normative age for this test, and the third child was unable to complete this measure due to time constraints.

Order of Administration of the Stories

In administering the stories, the order of administration was counterbalanced so that half of the subjects completed the "A" stories first and half of the subjects completed the "B" stories first. Using a multivariate analysis with number of story grammar units produced as the dependent variable and age as the covariate, no significant effect was found for order of administration ($p < .20$). Consequently, the two half samples (i.e., "A" first and "B" first) were combined for all analyses.

Story Grammar Elements

The mean total number of story grammar units used, as well as the standard deviation and range, for each story by the whole group of children are presented in Table 17. These results indicate that the mean number of story grammar units used increased as a function of story length, as expected. The variances also increased in the same manner. This was true for both the "A" and the "B" sets of stories.

Table 17

Means and Standard Deviations for Story Grammar Units

Story	M	SD	Range
1A	6.41	2.02	1 – 9
2A	9.67	3.00	3 – 15
3A	15.54	4.69	4 – 23
1B	6.21	1.76	2 – 9
2B	10.46	3.12	3 - 14
3B	13.89	4.76	3 – 21
All Stories	62.00	17.02	22-85

Use of Story Structure by Subjects of Different Ages

Considering the range of the number of story grammar units noted in Table 17 for the full sample, and because of the uneven distribution of children across the age groupings, the mean scores and standard deviations of total number of story grammar units produced for each age were calculated. These results are displayed in Figure 5. The small box represents the mean number of story grammar elements produced for each age. The bars have a length of two standard deviations and are centered at the means.

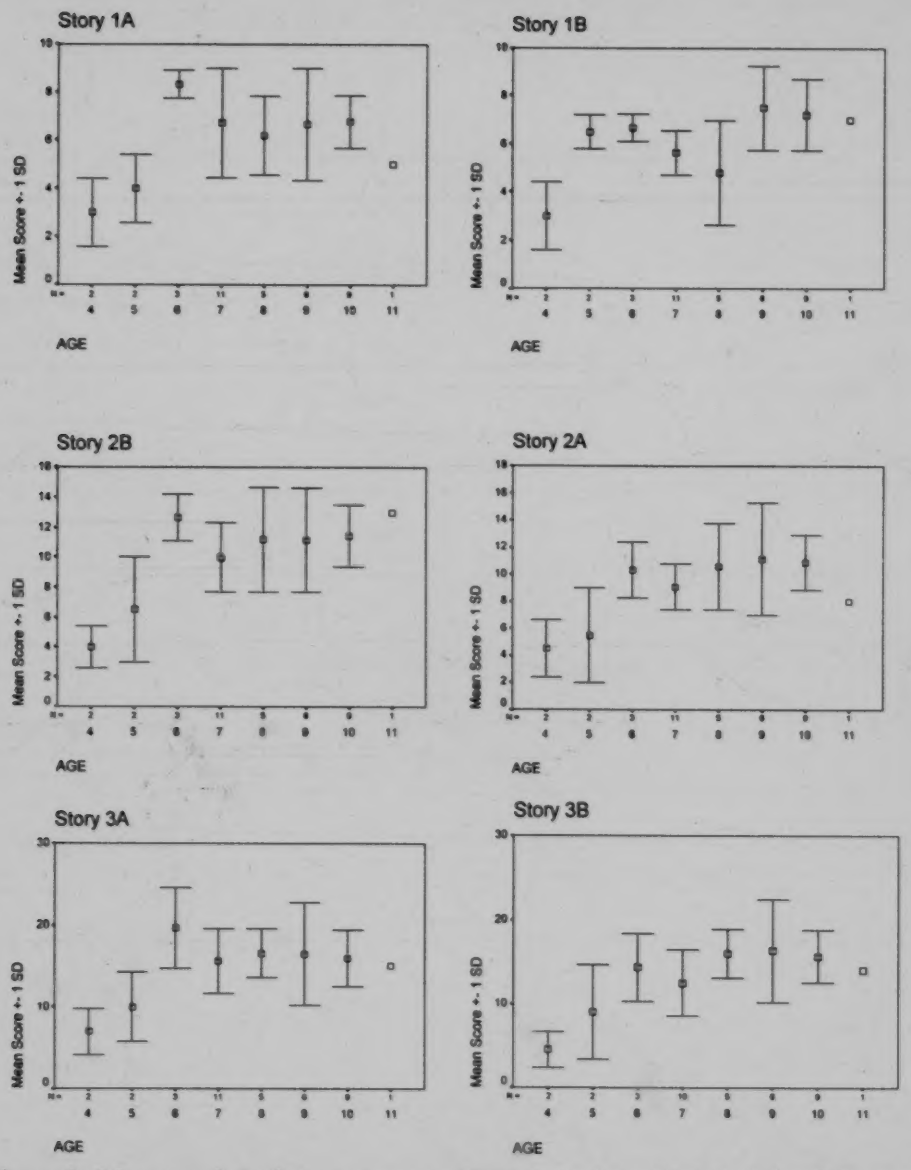

Figure 5. Mean number of story grammar elements (and standard deviations) for each of the stories presented by age of the children.

A visual inspection of Figure 5 suggests that, with the exception of story 1B, the scores for the 4- and 5-year old children tended to be similar, but different from the scores for the remaining children, which were also similar to each other. Given

these results, and the small number of 4- and 5- year old children, the students were grouped by age to form two groups. These groups were identified as the preschool/kindergarten group and the school-age group.

To confirm the differences noted and the formation of these two groups, a t-test of the mean differences between the two age-groupings for each story was conducted. The results of this analysis are reported in Table 18. The preset alpha level of .05 was divided by the number of comparisons (7) to account for the use the multiple t-tests, for an alpha level of .007. As shown, the groups differed significantly on all but one of the stories. As pointed out above, for story 1B, the 5-year olds were more similar to the older children than to the 4-year olds (see Figure 5).

Table 18

Differences between Preschool/Kindergarten and School-Age Groups

Story	Mean Difference	t	df	Significance
1A	-3.24	-3.445	37	.001[a]
2A	-5.20	-3.824	37	.000[a]
3A	-7.84	-3.645	37	.001[a]
1B	-1.62	-1.790	37	.082
2B	-5.81	-4.244	37	.000[a]
3B	-7.99	-3.666	36	.001[a]
All Stories	-31.57	-4.238	36	.000[a]

[a] significant at $p<.007$ (.05/7)

The difference between the scores of the preschool/kindergarten group and the school-age group suggested that it might be more appropriate to consider these two groups separately. Further, the number of story grammar units produced by the four

children in the younger group was varied. Because of the small number of children in this group, and the variability in their performance, the decision was made to analyze the two groups (preschool/kindergarten and school-aged) separately.

The results of a descriptive analysis performed for the preschool/kindergarten group are presented below. This description is then followed by the presentation of the results for the remaining group of 35 children, the school-age group. The results for this larger group are organized in terms of the five research questions presented in Chapter 3 (see p. 60).

Results for the Preschool/Kindergarten Group

Four children comprised the preschool/kindergarten group (two 4-year old children and two 5-year old children). The mean total number of story grammar units used, as well as the standard deviations and ranges, for each story by these children are presented in Table 19.

The mean number of story grammar elements provided increased across story levels for the preschool/kindergarten group (e.g., the mean for story 2A was higher than the mean for story 1A, the mean for story 3A was higher than the mean for story 2A, and so forth). These differences were not examined statistically due to the small sample size.

Table 19

Means and Standard Deviations for Story Grammar Scores – Preschool/Kindergarten Group

Story	M	SD	Range
1A	3.50	1.29	2 - 5
2A	5.00	2.45	3 - 8
3A	8.50	3.42	5 - 13
1B	4.75	2.22	2 - 7
2B	5.25	2.63	3 - 9
3B	6.75	4.35	3 - 13
All Stories	33.75	14.41	23 - 55

A description of the performance of these four children is presented below for each story. The key explaining the codes for the story grammar units was presented earlier in Table 8 (see p. 43).

Story 1A (Single Episode)

The consequence (C) was the only story grammar unit provided by all four of the children for this story (see Figure 6). Three of the children provided a setting (SET) and the second character (CHAR2). The first character (CHAR1) and the reaction for the second character (R2) were both provided by only one child (not the same child). Another student was the only child in this group to provide an internal response (IR) and an attempt (ATT), thus being the only child to produce a complete episode for this story. The initiating event (IE), internal plan (IP), and reaction for the first character (R1) were not provided by any of the children. It should be noted that

according to research with hearing children, internal responses and plans are rarely provided by children of this age (Hughes, McGillivray, & Schmidek, 1997). In general, complete episodes would not be expected from this age group (for single episode or multiepisode stories).

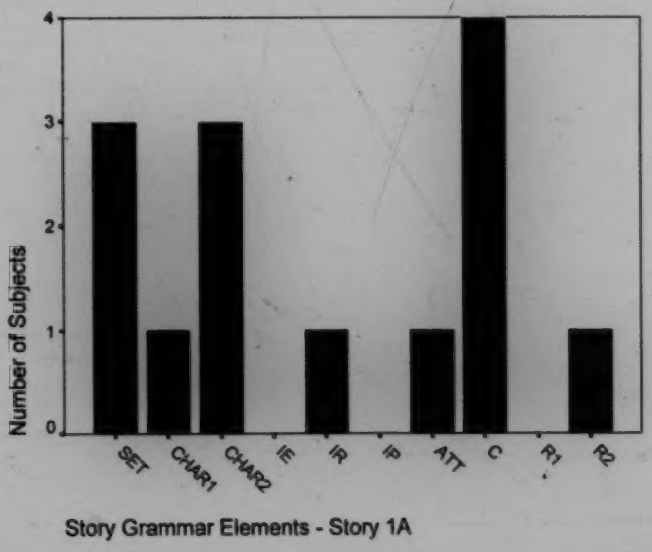

Figure 6. Number of preschool/kindergarten children using each story grammar unit for Story 1A (total n=4).

Story 2A (Two Episodes)

The attempt and the consequence in the first episode were the only story grammar elements provided by all four children for this story. The setting (SET), reactions for both characters in the first episode (R1, ep1; R2, ep1), and attempt in the second episode (ATT, ep2) were provided by two children (see Figure 7). None of the children produced an initiating event (IE), internal response (IR), or internal plan (IP) for either episode of this story. Consequently, no complete episodes were provided.

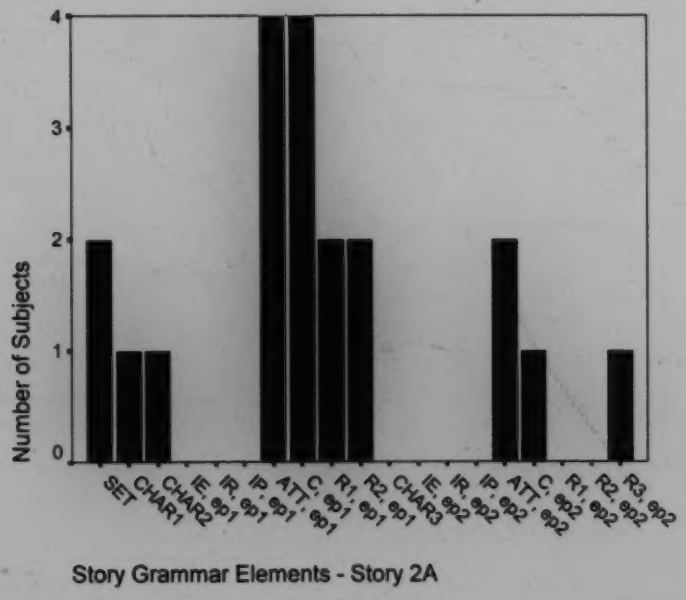

Figure 7. Number of preschool/kindergarten children using each story grammar unit for Story 2A (total n=4).

Story 3A (Three Episodes)

The attempt in the third episode (ATT, ep3) was the only story grammar unit provided by all four of the children for this story (see Figure 8). Three of the children provided the reaction for the first character in the first episode (R1, ep1), the consequence in the third episode (C, ep3), and the reaction for the first character in the third episode (R1, ep3). Initiating events (IE) were used more frequently in this story (by two children in the first and third episodes), although none of the children provided this element for the second episode. For this story, one of the children provided one complete episode and one of the children provided two complete episodes.

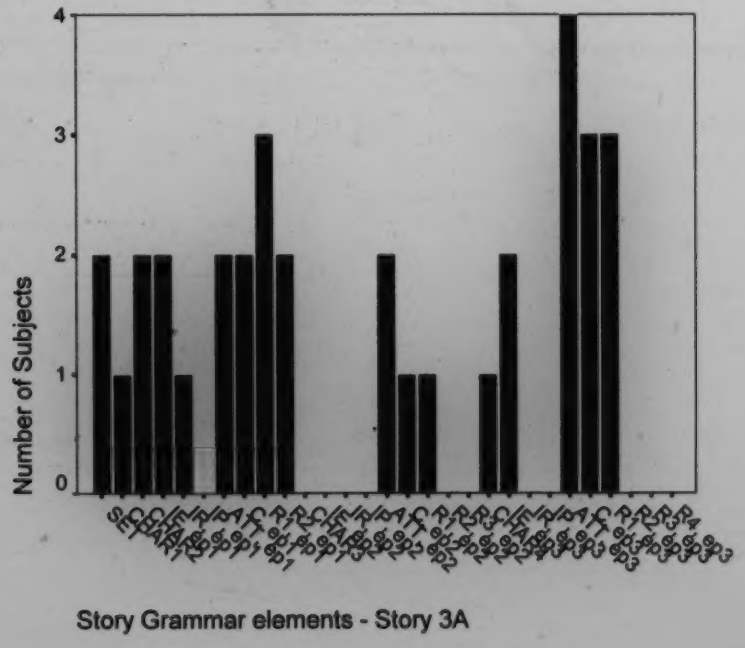

Figure 8. Number of preschool/kindergarten children using each story grammar unit for Story 3A (total n=4).

Story 1B (Single Episode)

At least three of the children provided four of the elements for this story (see Figure 9). The internal response (IR) and internal plan (IP) were the only elements not provided by any of the children. Two of the children provided a complete episode for this story.

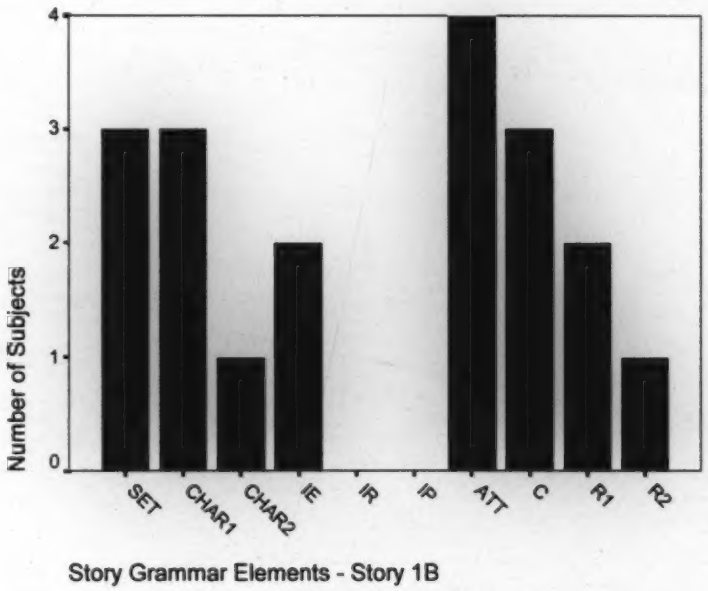

Figure 9. Number of preschool/kindergarten children using each story grammar unit for Story 1B (total n=4).

Story 2B (Two Episodes)

The consequence in the first episode (C, ep1) was the only story grammar element provided by all four of the children for this story, while the setting (SET) and the attempt in the first episode (ATT, ep1) were provided by three of the children (see Figure 10). Again, with the exception of one child who produced an internal response in the first episode (IR, ep1), the initiating event (IE), internal response (IR), and internal plans (IP) were not provided for either episode. Consequently, none of the children produced complete episodes for this story.

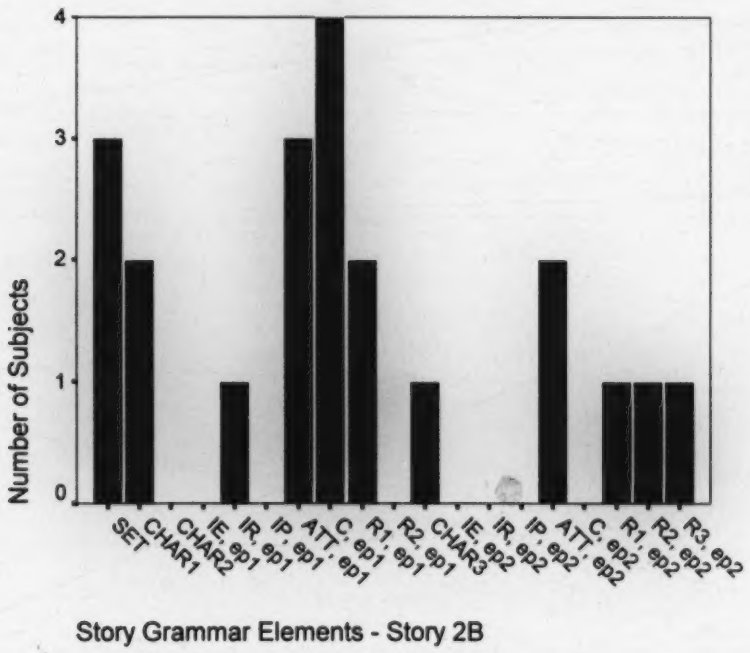

Figure 10. Number of preschool/kindergarten children using each story grammar unit for Story 2B (total n=4).

Story 3B (Three Episodes)

The setting element (SET) was the only story grammar unit provided by all four of the children for this story (see Figure 11). Consequences for the first and second episodes (C, ep1; C, ep2) were provided by three of the children. An initiating event for the first episode (IE, ep1) was provided by two of the children, and for the second episode (IE, ep2) by one child. None of the children produced an initiating event, internal response, or an internal plan for the third episode. One child produced one complete episode for this story.

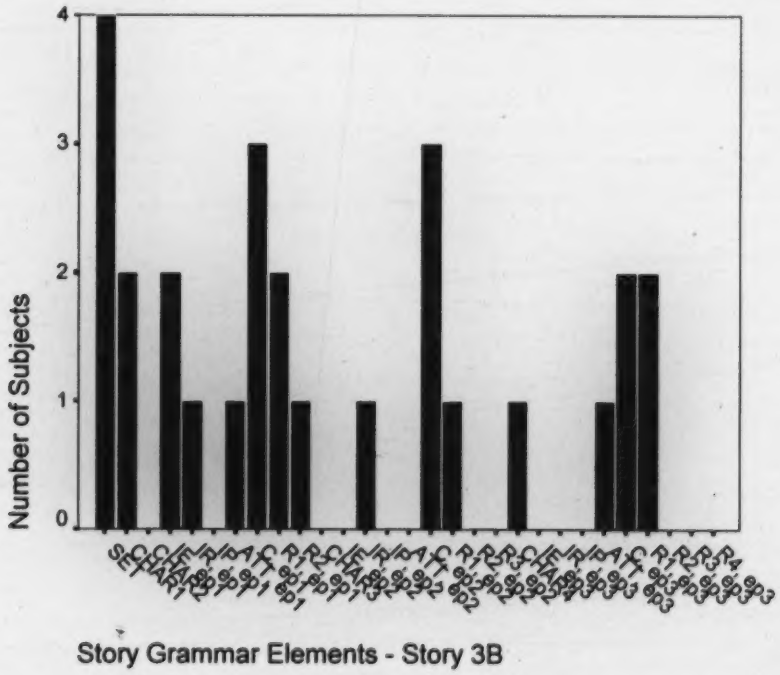

Figure 11. Number of preschool/kindergarten children using each story grammar unit for Story 3B (total n=4).

Comparison of Versions "A" and "B"

The stories elicited using the "A" picture sequences were compared to the stories elicited using the "B" picture sequences to determine if the two versions elicited comparable stories with respect to the story grammar elements provided by the children. Statistical analysis was not completed due to the small sample size. The following observations are based on a descriptive examination of the mean scores.

The mean number of story grammar units produced in response to story 1B was higher than the mean number of story grammar units produced in response to story 1A for these four students (see Figure 5, p. 76 and Table 19, p. 79). Production of the initiating event, attempt, and reaction of the first character would appear to be the major differences between the two stories for this group.

The mean number of story grammar units provided for stories 2A and 2B were similar (5.00 and 5.25 respectively). For both stories, the children did not produce internal responses or and internal plans for either episodes. As mentioned earlier, these elements would not be expected from children at this age. The results for these two stories are also similar in that the most commonly produced elements were the attempt and consequence for the first episode. The use of the other elements was more sporadic.

For the 3-episode stories, the mean number of story grammar elements produced for story 3A was higher than for story 3B (8.50 and 6.75 respectively). The largest discrepancy between the two versions of the stories appeared to be in the third episode of the stories. For story 3A, the four children combined produced 12 story

grammar elements for the third episode; for story 3B, the four children combined produced only 5 story grammar elements.

The composite total scores for the "A" version and the "B" version were more similar. The mean total score for "A" was 17.00 (SD 7.07) and the mean total score for "B" was 16.75 (SD 8.42). However, these numbers may be misleading, as the differences in the scores of the single episode stories would offset the differences in the scores in the 3-episode stories.

Results for the School-Aged Group

The results that follow are based on the 35 children that comprise the school-age group. These children range in age from 6 to 11 years. The mean age of the group is 8.72 (SD 1.34). There were 22 boys and 13 girls in the group.

The mean total number of story grammar units used, as well as the standard deviation and range, for each story by the group of school-aged children are presented in Table 20. A breakdown of these results is presented below, organized with respect to the five research questions for this study.

Table 20

Means and Standard Deviations for Story Grammar Scores – School-Aged Group

Story	M	SD	Range
1A	6.74	1.82	1 - 9
2A	10.20	2.59	3 - 15
3A	16.34	4.13	4 - 23
1B	6.37	1.66	3 - 9
2B	11.06	2.59	5 - 14
3B	14.74	4.10	4 - 21
All Stories	65.32	14.06	22 - 85

Story Grammar

Question #1 – Do the stories consistently elicit the required story grammar elements and episodic structure?

The results for each story are presented below. The key explaining the codes for the story grammar units can be found in Table 8 (see p. 43).

Story 1A (Single Episode)

The mean number of story grammar units used for this story was 6.74 (SD 1.82) (see Table 20). At least 25 of the 35 children in the group used all of the possible story grammar units coded for this story, with the exception of the internal response (IR), the internal plan (IP), and the reaction for the first character (R1) (see Figure 12). Six, 5, and 16, respectively, of the children used these three elements. The internal response and internal plan are considered optional elements and are not frequently used by young children in their storytelling.

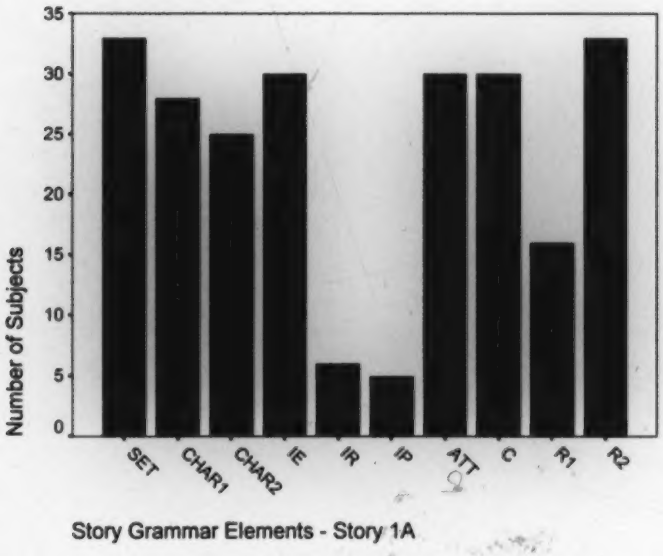

Figure 12. Number of children using each story grammar unit for Story 1A (total n=35).

Story 2A (Two Episodes)

The mean number of story grammar units used for story 2A was 10.20 (SD 2.59) (see Table 20, p. 87). As shown in Figure 3, eight of the story grammar units were used by at least 23 of the 35 children for this story. These elements included the second character (CHAR2), the attempt (ATT, ep1), consequence (C, ep1), and the second character reaction for the first episode (R2, ep1) and the initiating event (IE, ep2), attempt (ATT, ep2), and third character reaction for the second episode (R3, ep2). Most of the other elements were used by at least 11 children. The internal plan for the first episode (IP, ep1), and the internal response (IR, ep2) and the internal plan for the second episode (IP, ep2) were considerably lower, with just 1, 5, and 1 of the

children using these elements respectively. The initiating event in the first episode (IE, ep1) and the consequence for the second episode (C, ep2) were the only core episodic elements that were not produced by a majority of the children (the core episodic elements include the initiating event, the attempt, and the consequence). It should be noted that more children provided an internal response for the first episode (IR, ep1) than for the second episode, suggesting that perhaps some children provided an internal response in lieu of an initiating event. In fact, 10 of the 13 children that produced internal responses in the first episode (IR, ep1) did not provide an initiating event for that episode.

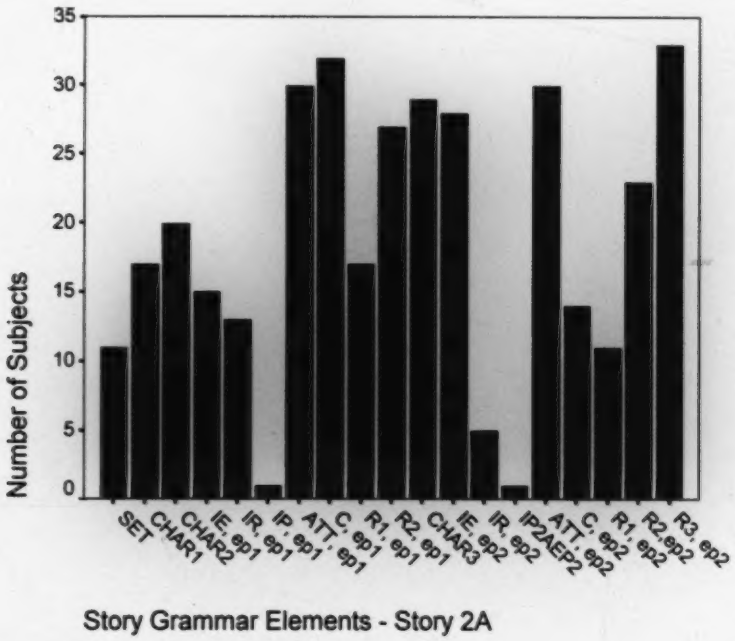

Figure 13. Number of children using each story grammar unit for Story 2A (total n=35).

Story 3A (Three Episodes)

The mean number of story grammar units used for this story was 16.34 (SD 4.13) (see Table 20, p. 87). Sixteen of the possible 29 story grammar units were used by at least 23 of the 35 children for this story. This includes all of the core episodic elements for all three episodes. The internal response for the second and third episodes (IR, ep2; IR, ep3), the internal plan for all episodes (IP, ep1; IP, ep2; IP, ep3), and reactions for multiple characters in the later episodes were used the least (by anywhere from 0-13 children) (see Figure 14).

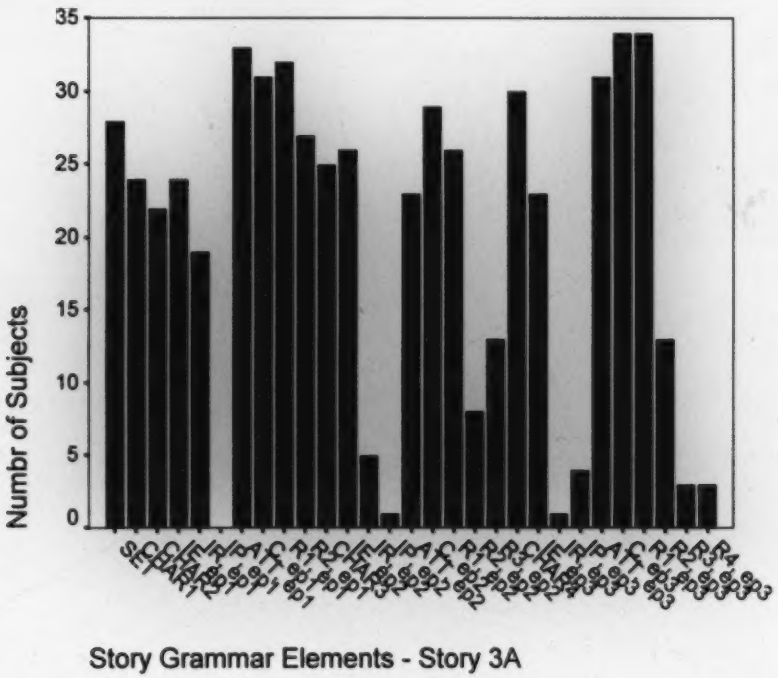

Figure 14. Number of children using each story grammar unit for Story 3A (total n=35).

Story 1B (Single Episode)

The mean number of story grammar units used for this story was 6.37 (SD 1.66) (see Table 20, p. 87). Twenty-three of the children used at least seven of the story grammar units (see Figure 15). The internal response (IR) and the internal plan (IP) were used by the fewest number of children (6 and 2 respectively). The setting element (SET) was provided by 19 of the children.

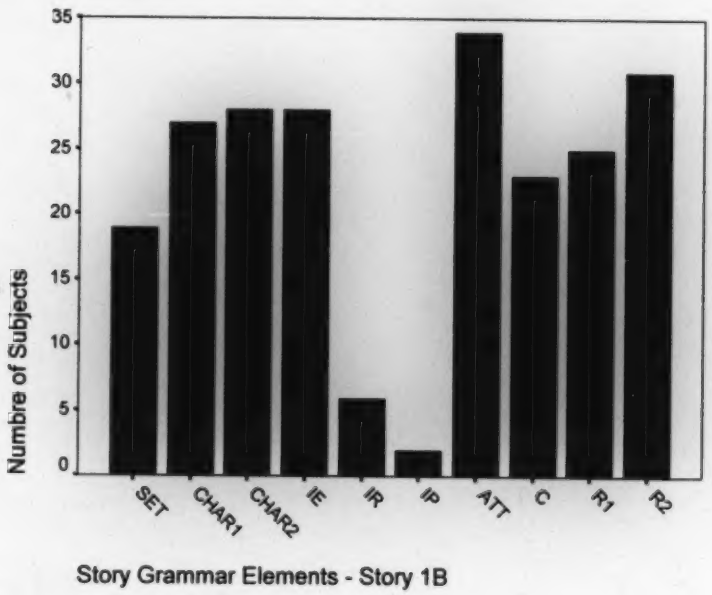

Figure 15. Number of children using each story grammar unit for Story 1B (total n=35).

Story 2B (Two Episodes)

The mean number of story grammar units used for this story was 11.06 (SD 2.59) (see Table 20, p. 87). At least 25 of the children used 10 of the 19 possible story grammar units for this story (see Figure 16). This included all of the core episodic elements except for the initiating event in the first episode (IE, ep1), that was provided by 19 of the children. Somewhat fewer children (14 to 20 children) produced the setting element (SET) and the reactions for multiple characters. The internal response and the internal plan for both episodes (IR, ep1; IR, ep2; IP, ep1; IP, ep2) were used by 0-4 of the children.

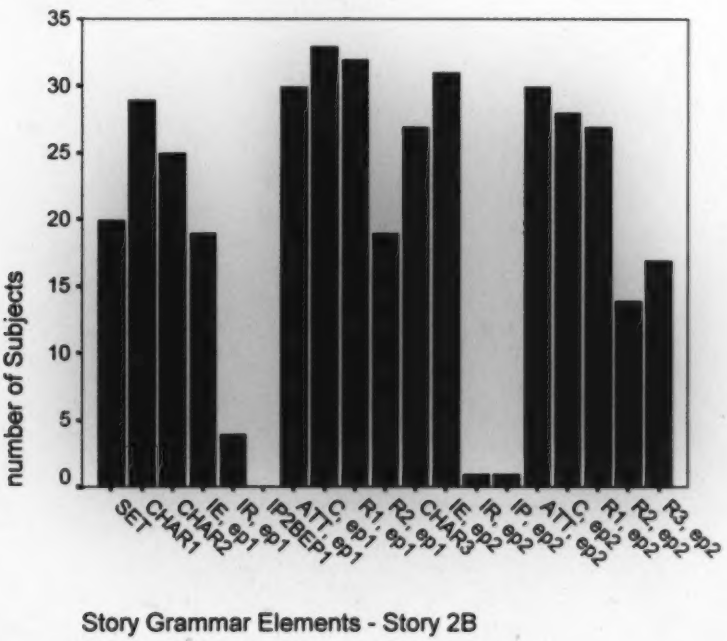

Figure 16. Number of children using each story grammar unit for Story 2B (total n=35).

Story 3B (Three Episodes)

The mean number of story grammar units used for this story was 14.74 (SD 4.10) (see Table 20, p. 87). As shown in Figure 17, twelve of the possible 29 story grammar units were used by at least 23 of the 34 children for this story (child #33 did not complete this story). Nineteen, 19, and 13 of the children provided initiating events respectively (IE, ep1; IE, ep2; IE, ep3). The internal response for the second and third episodes (IR, ep2; IR, ep3), the internal plan for all episodes (IP, ep1; IP, ep2; IP, ep3), and reactions for multiple characters in the later episodes were used the least (0-5 children).

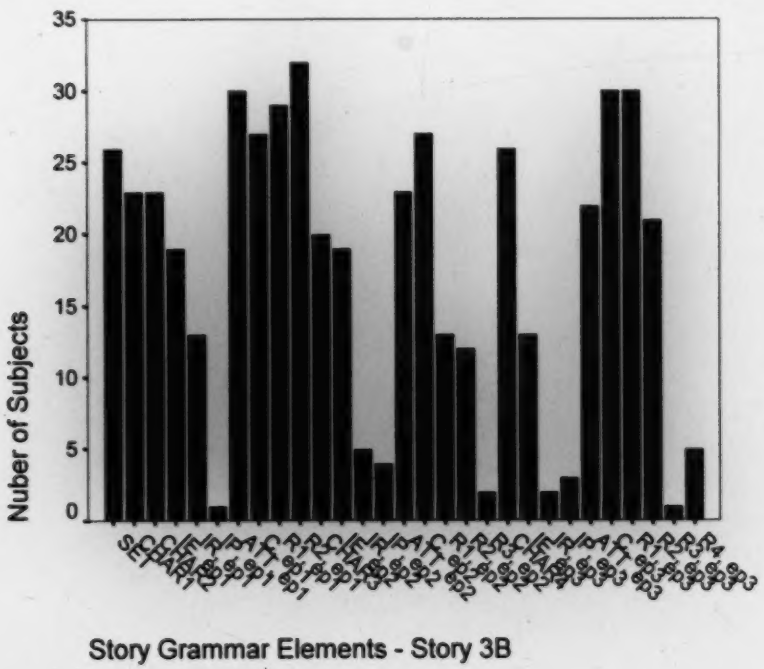

Figure 17. Number of children using each story grammar unit for Story 3B (total n=34).

Episodic Structure

For the purposes of this study a complete episode was defined as containing an initiating event (or internal response or plan), an attempt, and a consequence. A summary of the use of complete episodes for each story is provided in Table 21. Episodic structure was scored dichotomously as complete or incomplete.

Table 21

Use of Complete Episodes

Story	Number of Complete Episodes			
	0	1	2	3
1A	10[a]	25	NA	NA
2A	10	19 (1st – 12)[b] (2nd – 7)	6	NA
3A	5	6 (1st – 4) (2nd – 0) (3rd – 2)	10 (1st & 2nd – 2) (1st & 3rd – 6) (2nd & 3rd – 2)	12
1B	14	21	NA	NA
2B	6	15 (1st – 4) (2nd – 11)	14	NA
3B	9	8 (1st – 4) (2nd – 2) (3rd – 2)	10 (1st & 2nd – 5) (1st & 3rd – 3) (2nd & 3rd – 2)	7

[a] Indicates number of children (n=35 for all stories except 3B, where n=34)
[b] Indicates number of complete episodes provided for each episode in the story

For story 1A, 25 of the 35 children produced a complete episode. For story 1B, 21 of the children produced a complete episode.

For story 2A, only 6 of the children produced two complete episodes. Only 14 of the children produced a consequence in the second episode of this story (see Figure 13, p. 90), thus reducing the number of complete second episodes produced for this story. For story 2B, 14 of the children produced two complete episodes.

For story 3A, 12 of the children produced all three complete episodes and 10 of the children produced 2 complete episodes. For story 3B, only 7 of the children produced all three complete episodes, while 10 of the children produced two complete episodes. In story 3B, only 13 of the children produced an initiating event for the third episode (two produced an internal response and three produced an internal plan for this episode), thus reducing the number of complete third episodes (see Figure 17, p. 94).

Differences in Story Levels

Question #2 – Do the 2-episode stories contain more story grammar units than the 1-episode stories? Do the 3-episode stories contain more story grammar units than the 2-episode stories?

The mean score for story 1A was compared to the mean score for story 2A to examine if there was a difference in the total number of story grammar units used for the 2-episode story as compared to the single episode story. Similar comparisons were made for story 2A versus 3A, 1B versus 2B, and 2B versus 3B. As shown in Table 22, all of the comparisons were significant ($p<.000$), indicating that the stories did differentiate by level. That is, story 2A elicited significantly more story grammar

elements than story 1A and story 3A elicited significantly more story grammar elements than story 2A. The same pattern emerged for the "B" version of the stories.

Table 22

Differences by Story Level – Mean Number of Story Grammar Elements Produced

Pair	Mean Difference	t	df	Significance
1A-2A	(-3.46)	- 9.984	34	.000
2A-3A	(-6.14)	-12.889	34	.000
1B-2B	(-4.69)	-11.741	34	.000
2B-3B	(-3.71)	- 6.551	33	.000

In addition, the mean number of episodes provided was compared across story levels. This comparison was made in order to determine if the differences in the number of story grammar units produced was reflective of the number of core episodic elements (e.g., initiating event (or internal response or internal plan), attempt, and consequence). The difference in mean number of episodes produced was significant for story 2A versus story 3A ($p<.000$) and for story 1B versus story 2B ($p<.000$). The differences were not significant for story 1A versus story 2A and story 2B versus story 3B (see Table 23). The results indicate that, although the mean number of story grammar elements provided increased significantly for all story levels, the number of complete episodes produced did not always increase in the same manner.

Table 23

Differences by Story Level – Mean Number of Episodes Produced

Pair	Mean Difference	t	df	Significance
1A-2A	(-.17)	-1.358	34	.183
2A-3A	(-.89)	-4.987	34	.000
1B-2B	(-.63)	-5.392	34	.000
2B-3B	(-.21)	-1.125	33	.269

Story Structure by Age

Question #3 – Is there a difference in the number of story grammar units used by the children at different ages?

As the number of children at certain ages was very small (e.g., three 6-year olds, one 11-year old), a decision was made to group the children into age groupings rather than examine each age separately. Thus, the school-age sample was divided into two samples. The children who were 6- to 8-years old were grouped into what was referred to as the primary group (n=19); the children who were 9- to 11-year old were grouped into what was referred to as the intermediate group (n=16). These groupings correspond to the school-based groupings of the primary grades (grades 1 to 3) and the intermediate grades (grades 4 to 6).

The mean total story grammar scores for the primary and intermediate groups for each story were compared using t-tests to determine if the groups differed on this measure. The preset alpha level of .05 was divided by the number of comparisons (7) to account for the use the multiple t-tests, resulting in an alpha level of .007. These

differences were not significant for any of the stories except 1B, indicating that the primary and intermediate groups did not differ on their performance of these stories (see Table 24). Recall from Table 18 (p. 77), that for story 1B, there was no significant difference in the performance of the preschool/kindergarten children (4- and 5-year olds) and the school-aged children. Combined with the result presented here, it appears that, for this sample, the performance on story 1B differed from the other stories with respect to age of the children.

Table 24

Differences in Total Story Grammar Scores between Primary and Intermediate Groups

Story	Mean Difference	t	df	Significance
1A	.22	.347	33	.731
2A	-1.13	-1.298	33	.203
3A	.40	.282	33	.779
1B	-1.73	-3.557	33	.001[a]
2B	-.70	-.793	33	.433
3B	-2.03	-1.470	32	.151
All Stories	-5.29	-1.098	32	.280

[a] significant at $p > .007$ (.05/7)

Episodic Structure by Age

The primary and intermediate groups were also compared to investigate if they differed in their use of complete episodes. Research with hearing children suggests that complete episodes emerge at approximately 8 years of age. Thus, it would be expected that the intermediate group of children would produce complete episodes more often than would the primary group of children.

The mean number of episodes produced for the primary and intermediate groups for each story were examined using t-tests to determine if the groups differed on this measure. The preset alpha level of .05 was divided by the number of comparisons (6) to account for the use the multiple t-tests, resulting in an alpha level of .008 (note that the total number of episodes produced for all stories was not included in this analysis, thus reducing the number of comparisons to six rather than seven). These differences were not significant for any of the stories (see Table 25). These results indicated that, in accordance with the story grammar results, the number of complete episodes produced did not differ between the primary and intermediate groups for most of the stories.

Table 25

Differences in Use of Complete Episodes between Primary and Intermediate Groups

Story	Mean Difference	t	df	Significance
1A	-.30	-1.984	33	.056
2A	-.21	-.915	33	.367
3A	-.31	-.787	33	.437
1B	-.28	-1.682	33	.102
2B	-.62	-2.699	33	.011
3B	-.58	-1.568	32	.127

Bio-Demographic Factors

Question #4 – Is there a difference in the number of story grammar units used by groups of children defined by bio-demographic factors (e.g., gender, maternal signing ability, family deafness)?

Gender, maternal signing ability, and family deafness were chosen as bio-demographic factors for further analyses. The results of these analyses are presented below.

Gender

The group consisted of 13 girls and 22 boys. The mean age of the girls was 8.19 (SD 1.35) and the mean age of the boys was 9.04 (SD 1.27). This difference was not significant (t=-1.874, df=33, p<.07). A univariate analysis controlling for age as a covariate was completed (see Table 26). The preset alpha level of .05 was divided by the number of comparisons (7) to account for the use the multiple tests, resulting in an alpha level of .007. Using this analysis, there were no significant differences in the performance between the boys and the girls for any of the stories.

Table 26

Univariate Comparisons of Total Scores Based on Gender

Story	MS	df	F	p
1A	4.666	1	1.434	.240
2A	3.187	1	.466	.500
3A	72.089	1	4.463	.043
1B	4.063	1	1.632	.211
2B	21.360	1	3.284	.080
3B	6.966	1	.421	.521
All Stories	471.436	1	2.458	.127

Maternal Signing Ability

The scores for the children whose mothers rated themselves as non to average signers (n=22) were compared to the scores for the children whose mothers rated themselves as good to fluent signers (n=12) (one parent did not provide this information). The mean ages of the groups were 8.77 (SD 1.38) and 8.61 (SD 1.40) respectively. This difference was not significant (t=.318, df=32, p<.753). A univariate analysis controlling for age as a covariate was completed (see Table 27). The preset alpha level of .05 was divided by the number of comparisons (7) to account for the use the multiple tests, resulting in an alpha level of .001. Using this analysis, there were no significant differences in the performance between the two groups for any of the stories. This result differed from the expected outcome. It was predicted that the group of children whose mothers were more proficient signers would perform better on the story grammar measures than would the group of children whose mothers were less proficient signers.

Table 27

Univariate Comparisons of Total Scores Based on Maternal Signing Ability

Story	MS	df	F	p
1A	.354	1	.101	.753
2A	3.570	1	.513	.479
3A	67.313	1	4.120	.051
1B	1.971	1	.803	.377
2B	12.070	1	1.745	.196
3B	26.297	1	1.678	.205
All Stories	428.288	1	2.230	.146

Family Deafness

A third factor investigated for possible relevance was family deafness. This variable, scored dichotomously, was based on information provided by parent report. Children were rated as having deaf family if it was indicated that there was another immediate family member who was deaf (parent or sibling).

The scores for the children with Deaf family members (n=12) were compared to the scores for the children with no other Deaf family members (n=23). The mean ages of the groups were 8.29 (SD 1.10) and 8.95 (SD 1.43) respectively. This difference was not significant (t=-1.382, df=33, $p \leq .176$). A univariate analysis controlling for age as a covariate was completed (see Table 28). The preset alpha level of .05 was divided by the number of comparisons (7) to account for the use the multiple tests, resulting in an alpha level of .007. Using this analysis, there was no significant difference in the performance of the two groups. Again, these results differed from the expected outcome. It was predicted that the group of with Deaf family members would perform better on the story grammar measures for all stories than would the group of children with no other Deaf family members.

Table 28

Univariate Comparisons of Total Scores Based on Family Deafness

Story	MS	df	F	p
1A	1.277	1	.379	.542
2A	8.667	1	1.302	.263
3A	72.689	1	4.505	.042
1B	7.593	1	3.196	.084
2B	42.786	1	7.361	.011
3B	102.758	1	7.632	.010
All Stories	1026.120	1	5.900	.021

Equivalent Forms

Question #5 – Do versions "A" and "B" of the picture stories elicit stories that are comparable with respect to the number of story grammar units used (i.e., are the two forms equivalent)?

Stories 1A, 2A, and 3A were compared with stories 1B, 2B, and 3B respectively to evaluate if the two forms of the picture stimuli were equivalent. Comparisons were made based on total number of story grammar units produced. A coefficient of equivalence was calculated for each of these story pairs. Significant correlations were found for all three pairs. The values of the Pearson product-moment correlation coefficients for each of these pairs are found in Table 29.

Although all of these correlations were found to be significant, the magnitude of the correlations would not be considered sufficiently high enough for alternate forms reliability. The accepted standard for reliability coefficients for assessment measures has been quoted as .80 to .90 (Hammill, Brown, & Bryant, 1992).

Table 29

Correlation for Forms "A" and "B"

Story Pair	Correlation	Significance	Magnitude[a]
1A-1B	.48	.001	Moderate
2A-2B	.46	.000	Moderate
3A-3B	.78	.000	Moderate-High

[a] based on Guilford's criteria (1956)

The mean differences between the story pairs were also computed. Using a liberal alpha ($p<.20$), the single episode stories did not differ significantly. However, the mean scores for the two and the three-episode stories did differ significantly (see Table 30). The more liberal alpha of .20 was used for these analyses to decrease the possibility of a Type II error, which would conclude that the two forms are equivalent when in fact they are not. With the 2-episode stories, the mean score for story 2B was significantly higher than the mean score for story 2A. With the 3-episode stories, the opposite was true; the mean score for story 3A was significantly higher than the mean score for story 3B. The correlational and mean difference results suggest that the two forms were not equivalent and, therefore could not be used interchangeably.

Table 30

Differences between Versions "A" and "B" – School-Aged Children

Pair	Mean Difference	t	df	Significance
1A-1B	.37	1.232	34	.226
2A-2B	-.86	-1.884	34	.068[a]
3A-3B	1.62	3.400	33	.002[a]

[a] significant at $p<.20$

Differences in Equivalent Forms – Primary versus Intermediate Group

The differences between versions "A" and "B" for the two and three episode stories were further examined to determine the effect of age of the children. The mean differences between the two versions were examined for the primary group and for the intermediate group. The results of these analyses indicated that, for the primary group, there was a significant difference between the two versions at all levels. For the intermediate group, there was a significant difference between the two versions only for the single episode stories (see Table 31). This finding indicated that, for the multiepisode stories, the intermediate children (ages 9-11) produced stories that were more similar across the two versions as compared to the primary children (ages 6-8).

Table 31

Differences between Versions "A" and "B" – Primary and Intermediate Groups

Primary Group				
Pair	Mean Difference	t	df	Significance
1A-1B	1.26	3.076	18	.007[a]
2A-2B	-1.05	-1.606	18	.126[a]
3A-3B	2.78	4.244	17	.001[a]
Intermediate Group				
Pair	Mean Difference	t	df	Significance
1A-1B	-.69	-2.551	15	.022[a]
2A-2B	-.63	-.979	15	.343
3A-3B	.31	.573	15	.575

[a] significant at $p<.20$

CHAPTER 5: DISCUSSION

Introduction

The purpose of this research was to develop and validate the Picture Story Language Instrument (PSLI), an instrument to be used to collect narrative stories from children. A professional artist developed the picture stimuli for the PSLI from stories prepared by the researcher and reviewed by a panel of experts. A feasibility study and a small-scale pilot study followed. The results of these studies provided the foundation for establishing the administration procedures and the coding protocol to be used in a field study of the PSLI.

The field test involved a sample of 39 children, ages 4 to 11 years of age, who were deaf and used sign language as their primary means of communication. In presenting the stories to the children, the order of administration was controlled so that half of the children completed the "A" stories first and half of the children completed the "B" stories first. There was no significant effect found for order of administration of the stories. Consequently the two half samples were combined.

The group of 4- and 5-year old children (n=4) scored significantly lower on the measures of story grammar than did the group of older children (except for story 1B). The decision was therefore made to examine the data collected from those four children separately. This group of four children was labeled the preschool/kindergarten group. The remaining 35 children (ages 6 to 11) were labeled as the school-aged group. The use of story grammar elements for each of the six stories was analyzed for this group as a whole. As well, for some additional analyses, the school-aged children were divided into two groups: the 6- to 8- year old

children were grouped into the primary group and the 9- to 11-year old children were grouped into the intermediate group.

The discussion that follows is organized in terms of the five research questions that were posed. Unless otherwise stated, the discussion pertains to the school-aged group of children.

Question #1 – Do the stories consistently elicit the required story grammar elements and episodic structure?

Story Grammar Structure

Preschool/Kindergarten Group

Overall, the preschool/kindergarten group of children provided a similar trend of story grammar use across the stories. Within each set of stories, these children provided stories of increasing length in response to the longer picture stimuli. In general, the children provided some type of setting information in their stories (either setting or character elements). Attempts, consequences, and reactions for at least one of the characters were frequently provided. However, these children did not often provide initiating events, internal responses, or internal plans. This finding would be consistent with previous research that indicates that children do not typically include goal-directed behavior in their stories until approximately age six (Hughes, McGillivray, & Schmidek, 1997).

School-aged Group

Each of the six stories was examined to determine the representation of story grammar elements and episodic structure elicited with the stimuli. The individual stories are discussed below.

Story 1A. The average number of story grammar units produced for this story by the school-aged group was 6.74, with a range of 1 to 9. The required elements for this story were provided by a majority of the children (70%). The optional elements of internal response, internal plan, and the reaction of the first character were not used consistently. These "optional" elements include structures that require an internalized response to the situation and a plan for resolution. Research with hearing children has found that complete episodic structure emerges in stories at approximately eight years of age, and the use of the internal responses and plans emerges at approximately the same time (Hughes, McGillivray, & Schmidek, 1997). Sixty-four percent of the children provided a complete episode for this story.

This story appears to have captured the essential elements for eliciting a "good" story. The children were able to consistently identify the setting and characters, although the first character was sometimes identified as a horse or cow rather than a giraffe (this was also true for stories 2A and 3A). The "correct" identification of the characters was not essential for this study, only that a character be identified.

Story 2A. The overall use of story grammar elements was not as strong for story 1A. The mean number of story grammar units included in this story was 10.20, with a range of 3 to 15. The setting and character elements were used by less than

half of the children. One possible explanation for this may be that this story always followed story 1A and as such, may have been viewed as an extension of this story. In this case, the children may have considered it redundant to reiterate this information. An initiating event for the first episode was given by only 15 of the 35 children and the consequence for the second episode was provided by only 14 of the children. As a result, only 6 of the children produced both complete episodes for this story. Ten of the children did not produce any complete episodes. The only children that gave two complete episodes were 9- and 10-year olds.

The fact that this story did not elicit a strong initiating event in the first episode may be at the core of the problematic findings for this story. Without a stimulus to cue a goal-directed behavior for the main character, it would have been difficult for the children to create a story that included this information. It may have been necessary for the children to infer a goal-directed behavior on the part of the character. It is worth noting that, for the first episode of this story, almost as many children gave an internal response as the number of children who gave an initiating event. This suggests that the picture stimuli offered an opportunity for the response to be articulated but the initiating event needed to be inferred.

Story 3A. This picture sequence elicited more consistent stories than did story 2A. An average of 16.34 story grammar units was used, ranging from 4 to 23. Each of the required elements for the three episodes were provided by at least 74% of the children. Reactions were generally provided for at least one of the characters in each episode. An internal response was given for the first episode by over half of the children, but not in the other episodes. Internal plans were not consistently provided

for any of the episodes. A complete, three-episode story was provided by one-third of the children. However, given the developmental nature of story structure acquisition, it would not be expected that the younger children would produce a complete, multi-episode story (Hedberg & Westby, 1993; Hughes et al., 1997).

Identification of the main characters was not a problem for this story. The fourth character was alternatively identified as a lifeguard or the elephant's mother. Both of these labels could be viewed as accurate depictions of the character.

Story 1B. The mean number of story grammar elements for this story was 6.37, with a range of 3 to 9. All of the elements, with the exception of the internal response and plan, were used by over half of the children for this story. Identification of the physical setting was less consistent than in story 1A. However, unlike story 1A, most of the children provided reactions for both of the characters for this story. Slightly more than half of the children (53.8%) produced a complete episode story.

Although most of the children made reference to the characters in this story, character identification was somewhat less consistent with this story than for story 1A. In addition to being identified as a rabbit and a dog, the two main characters were alternately identified as two rabbits, a dog and a mouse, and a dog and a cat. Male versus female distinction between these characters was not often made. However, it did not appear that the children confused the two characters. The children were required to provide a label for the character in order to be credited for the characters story grammar units (CHAR1, CHAR2). However, they were not required to identified the characters as specific animals. Therefore, credit was given for any of the above mentioned character references.

Story 2B. This story elicited an average of 11.06 story grammar units, with a range of 5 to 14. All of the required elements for the second episode were provided by at least 80% of the children. The attempt, consequence, and reaction of the first character in the first episode were provided by over 85% of the children. However, the setting and the initiating event for the first episode were not used as consistently. The optional elements of internal response and internal plan were seldom given. More children provided two complete episodes in response to this story as compared with story 2A.

Like for story 1B, identification of the main characters was less consistent for story 2B than it was for story 2A. The third character in this story (a female rabbit with a doctor's lab coat and bag) was alternately referred to as a doctor, a nurse, or the rabbit's mother. All of these references were considered accurate.

Story 3B. The mean number of story grammar units provided for this story was 14.74 (range 4 to 21). This was significantly lower than the mean for story 3A. The initiating event for all three episodes was provided less consistently for this story as compared to story 3A.

The children appeared to be have difficulty specifying the goal-directed behavior of the characters and their attempts to resolve the problems. Reactions for both characters were generally provided for the first episode and a reaction for the first character was generally provided in the last episode.

Episodic Structure

The picture stories were structured to elicit complete episodes, with multiple episodes for the level two and three stories. According to the literature on the

acquisition of episodic structure (see Hughes et al., 1997 for a summary), the use of complete episodes emerges at approximately 7 to 8 years of age (for normally hearing children). Multiple episode chains also emerge at approximately this age for normally hearing children.

Despite the small number of children in each age group for this study, it appears that these stories do generally fit a similar developmental pattern. As would be expected, the 4-year old children did not produce complete episodes, nor did the 5-years olds (except for story 1B). Approximately half of the 7- and 8-year olds produced complete episodes for stories 1A and 1B. However, these children did not produce complete episodes for the multiepisode stories with any consistency. The older children (9- to 11-years old) consistently produced more complete episodes as compared to the younger children for both the single and multiple episode stories. Only one child, a 9 year old, produced all of the expected episodes for each story. This child actually chose to tell the stories orally rather than using sign language (English was his second language, spoken Russian his first, and ASL his third).

Question #2 – Do the 2-episode stories contain more story grammar units than the 1-episode stories? Do the 3-episode stories contain more story grammar units than the 2-episode stories?

Difference in Levels

Within each set of picture sequences, an attempt was made to control for the length and complexity of the stories. In addition to increasing the number of episodes, the stories also increased in complexity through the introduction of

additional characters. The length of the stories increased systematically with the number of episodes. It was hypothesized that as the picture sequences increased in length and complexity, the number of story grammar units included in the stories would increase. Significant differences were found between the levels of stories for both versions for the school-aged children. As well, this difference was consistent for all ages (preschool/kindergarten, primary, and intermediate). The differences between the levels were less pronounced for the preschool/kindergarten group. Thus, as expected, the number of story grammar units produced did increase as the length and the complexity of the stories increased.

The increase in number of story grammar units produced was not always reflective of increased use of complete episodes. Stories 2A and 3A differed significantly in the number of complete episodes provided in response to the stories, as did stories 1B and 2B. Stories 1A and 2A, and stories 2B and 3B did not differ significantly on this measure.

Question #3 – Is there a difference in the number of story grammar units used by the children at different ages?

Age Differences

It was also hypothesized that the PSLI would differentiate among the children based on age. That is, that the older children would produce more story grammar units as compared to the younger children. This hypothesis was difficult to test given the low number of children in some of the age groupings and the variability in numbers between the groups. A visual analysis of the graphs of the means for each

story indicated that the children appeared to fall into two distinct groups. The 4 and 5 year old children appeared to cluster together and the 6 to 11 year olds appeared to cluster together. This was true for all stories except 1B, where the 5 year olds clustered with the older group. Statistical analysis comparing the means for these two groups did reveal a difference in the number of story grammar units produced by the younger group as compared to the older groups. This difference was significant for all stories except 1B. These two groupings would correspond roughly to a preschool/kindergarten group (i.e., pre-elementary) and an elementary school-aged group.

The school-aged group was further divided into a primary and an intermediate grouping. It is interesting to note that there were no significant differences in the number of story grammar units used between the ages of 6 and 11, with the exception of story 1B. This finding may be unique to this particular subject pool, given the uneven distribution among the age groupings. This finding was also confirmed in examining the use of complete episodes by the primary and intermediate groups. Although it was hypothesized that the intermediate group would provide more complete episodes, this was not the case.

Question #4 – Is there a difference in the number of story grammar units used by groups of children defined by bio-demographic factors (e.g., gender, maternal signing ability, family deafness)?

Bio-Demographic Features

Due to the small size of the study sample, the group was not stratified a priori for possible factors, which may have influenced the outcome of the study. Gender, maternal signing ability, and family deafness were chosen as factors to study post-hoc. Gender was considered to see if boys and girls were differed in their scores. Maternal signing ability and family deafness were chosen as indicators of the home environment of the children. It was hypothesized that gender would not be a relevant factor in story grammar use. It was hypothesized that maternal signing ability and family deafness would be relevant factors in the story grammar scores. More specifically, it was predicted that those children whose mothers were more proficient signers would score higher on the story grammar measures compared to those children whose mothers were less proficient signers. Similarly, it was predicted that those children who had other deaf family members would score higher on the story grammar measures compared to those children who did not have any other deaf family members. These analyses were completed for the school-aged group of children only.

When age was controlled as a covariate, the results of these analyses were non-significant for all comparisons for gender, maternal signing ability, and family deafness. While these characteristics have not been examined specifically in the literature, a related factor of parental hearing status has been studied in depth. Research in other areas of language functioning that indicates that deaf children of deaf-parented families tend to outperform deaf children of hearing-parented families.

Question #5 – Do versions "A" and "B" of the picture stories elicit stories that are comparable with respect to the number of story grammar units used (i.e., are the two forms equivalent)?

Equivalent Forms

In designing the two sets of picture sequences, care was taken to design two equivalent versions. The stories were designed to include the same elements and to be consistent with respect to the setting, number and gender of characters, length, and overall complexity. It was hypothesized that if the two versions were constructed to be the same along these dimensions, then they would elicit comparable stories. This hypothesis was tested in two ways. First, the correlations between the "A" stories and the corresponding "B" stories were examined (i.e., 1A and 1B, 2A and 2B, and 3A and 3B,). In addition, the means for each of the story pairs were compared for differences. Again, these analyses were performed only for the school-aged group of children.

The scores on the "A" stories were found to be related to the scores on the "B" stories ($p<.001$) (i.e., 1A correlated with 1B, 2A with 2B, and 3A with 3B). However, the magnitude of these correlations was moderate for the level 1 and level 2 stories and moderately high for the level 3 stories. However, all of the values were less than what is required to claim that the two versions are interchangeable and therefore equivalent (Hammill, Brown, & Bryant, 1992).

By comparing the means for the two forms of the stories, one could ascertain if similar scores could be expected for the two versions. This was the case only for the single episode stories. The mean scores for use of story grammar elements for

stories 1A and 1B were not significantly different. However, the differences were significant for the 2- and 3-episode stories. The mean score for story 2B was significantly higher than 2A and the mean score for 3A was significantly higher than 3B ($p<.20$).

The differences between the two versions of the stories differed for the primary and intermediate groups. For the primary group, the differences between the "A" stories and the "B" stories were significant at all levels. For the intermediate group, the differences were significant only for the single episode stories.

It can be concluded that, based on the results of this study, the two forms of the instrument are not equivalent. That is, they do not elicit stories that are comparable with respect to story grammar elements. The correlations are not strong enough to meet a rigorous test of reliability.

Implications of the Findings

Assessing Deaf Children

The results of this study provide an initial database for the use of the PSLI with a population of deaf students who use sign language. This provides a unique contribution, as there is no information currently available in the literature regarding story grammar production of children who are deaf and who use ASL. In its current form, the PSLI provides a tool that is useful for eliciting and analyzing narratives for research purposes. Additional studies establishing the validity and reliability of the PSLI are necessary in order to ensure its applicability in a clinical setting.

Currently, there are several assessment instruments being developed for ASL. The preliminary information that is available regarding these measures suggests that

these tests will yield different kinds of information than the PSLI. The developments in this field are new initiatives that have been undertaken since the initiation of this project. Publication of the initial findings from these instruments over the next few years will provide interesting insights in this area.

Psychometric Properties of the PSLI

The results of this study provide preliminary information regarding validity and reliability of this instrument. As discussed earlier, content and construct validity of the instrument was established using expert panels. Further evidence for content and construct validity were provided through the course of the main study. The differences found in examining the three levels of stories, as well as the differences found between the performance of the preschool/kindergarten children as compared to the school-aged children, lend evidence to the validity of the measure. Alternate forms reliability of the instrument was investigated; the results suggest that the forms were not equivalent and, hence, should not be used interchangeably at this time. For the time being, it is recommended that a single form of the instrument (i.e., either the "A" series or the "B" series) for pre- and post-testing. Further testing with a larger, more heterogeneous sample may yield better results on form equivalency. If not, changes may need to be made to the picture stories to elicit more equivalent samples.

Through the course of this study, it has become apparent that the PSLI has applicability as both a norm-referenced instrument and a criterion-referenced instrument. The number of deaf children using ASL and English that attend provincial schools for the deaf in Canada is limited. Therefore, establishing a normative base with this population may not be appropriate. The PSLI may be more

useful in this realm for establishing norms with the larger population of school-aged children. Additionally, the PSLI provides a means for gathering detailed, criterion-related evidence that would be invaluable to the assessment process.

One other study has been conducted using the PSLI with a group of 10 hearing children, ages 5 and 9 (van der Meer, 1999). The results of that study confirm the findings of the current study with respect to the increasing levels of difficulty of the PSLI and a differentiation between the 5-year olds and the 9-year olds. However, unlike the current study, van der Meer's study found the two forms of the instrument to be equivalent. Both of the studies had relatively small samples, which may have contributed to discrepancies in the findings. In addition, one must bear in mind that van der Meer's study involved hearing children rather than deaf children.

Story Structure

Numerous studies have been conducted over the years investigating the production of story grammar units by children in storytelling tasks (see review of literature for a discussion). The results of the current study converge with the general findings of other studies to indicate that the acquisition of story structures schema follow a developmental pattern differentiated by younger and older children (e.g., preschool-aged versus school-aged). The children in this study clustered into two distinct groups. However, where this study found no differences between the ages of 6 to 11, other studies with hearing children have found a developmental pattern within this age-group. The research cited involved typically performing hearing children (Hughes, McGillivray, & Schmidek, 1997). No research is currently available regarding the performance of deaf, signing children on these measures. Thus, it is

difficult to ascertain if the findings of this study are idiosyncratic to this subject pool, typical of deaf children, or a shortcoming of the instrument. Given the variability of the children involved in this study with respect to their backgrounds and exposure to language during the early years, it may be that the results are sample-dependent rather than representative of a larger population. Further studies using the PSLI with deaf and hearing children in this age range are necessary to confirm these results.

The acquisition pattern for episodic structure found in this study would appear to be in line with previous findings (Hughes et al., 1997). However, all of the available literature concerning episodic structure is from studies conducted with hearing children. Again, with this variable there was no differentiation among the children ages 6 to 11. As with the story grammar score, this finding may be sample-dependent and reflective only of the varied language competencies of the children involved in this study. There is no published information regarding the episodic structure of stories told by children who are deaf and who use ASL.

Griffith and Ripich (1988) examined story grammar use with deaf children in a total communication program. In the condition that most closely matches the conditions used in this study (self-generated stories from picture sequence), the children displayed a similar pattern of story structure usage. These authors noted that the features most salient in the pictures (setting, resolution, reactions) were used the most by the children. That finding mirrors the findings of the current study. The results of their study, and this current study, would indicate that the deaf students do use a story structure schema when telling stories, whether in English or in ASL. This

confirmation provides important validation information for the use of this story grammar model with deaf children.

Limitations of the Study

The purpose of this study was to perform an initial field test for a newly developed instrument. This information will contribute to the further revision of the PSLI. Only preliminary validity testing was undertaken in this study. Further testing to establish the psychometric properties of the PSLI must be completed. As mentioned earlier, in its current form, the PSLI is appropriate for use as a research tool. Its applicability in a clinical setting will be dependent upon further validation and refinement. Several factors that may have influenced the outcomes of this study must be considered.

The proposed study was to include two pilot studies, with sample sizes of four and twelve respectively. The proposed main study was to include a sample of 40 children. The children recruited for the second pilot study did not match the proposed criterion with respect to their level of performance (this study was to include low-to average performing children; the actual study sample included children with a wide range of abilities). As the sample of children from the proposed second pilot study was similar to the children from the main study, they were included in the main study. The second pilot test was deleted from the study. The total number of children participating in the main study was 39, which was only one less child than the proposed sample. However, the distribution of children in the actual sample was uneven, and several of the age groupings were quite small. For this reason, the ages were grouped. The small number of subjects across the age range limits the strength

of the statistical findings. Although the number of subjects was limited, the sample included all of the potential students from three of the six provincial programs for the deaf in Ontario and Western Canada. Thus, the difficulty may be that this population is more limited than was originally thought. Future studies with this population should consider the issue of adequate sample size and subject availability.

The children who participated in this study varied greatly in terms of their abilities in ASL and English. All of the children were exposed to ASL and written English in their school environments. Their exposure to spoken English varied depending upon their audiological ability and speech training. All but two of the children chose to use ASL to complete the storytelling task (one student used spoken English, one used simultaneous speech and sign). However, their exposure to ASL as a first language differed greatly from child to child. Some of the children would have been exposed to sign language from birth (i.e., those with deaf parents or older family members). However, the majority of children were not immersed in an ASL environment until they attended the provincial school for the deaf. As well, their home environments continue to vary greatly with respect to language use. Thus, even for the older children, the variability in their language use and of their narrative abilities was great.

As no other formal measures of language functioning were administered during this study, it was difficult to ascertain the overall language abilities of the children, in ASL and in English. The classroom teachers for each student completed the Teacher Rating Form. However, several teachers indicated that they had difficulty with the subjective nature of this measure and were unsure about the gradations for

rating students. Therefore, this information was not included in any of the analyses for this study. Additional language measures would provide information about the individual children and their level of language competency.

The hearing status and signing ability of the adult interacting with deaf children may influence their communication (Johnson, Liddell, & Erting, 1989). In the case of this study, the researcher was hearing and a non-native signer. The researcher used ASL with the students in all interactions unless the students indicated that they preferred to use some other means of communication (e.g., simultaneous speech/sign, spoken English). All children were also asked their preference with respect to how they told the stories. Two of the children indicated that they preferred to use simultaneous speech/sign or speech only rather than ASL.

Ideally, a second researcher who was deaf and a native signer should have been available to address interrater reliability. Unfortunately, this was not possible during the course of this study. However, this issue must be examined before the PSLI would be ready for use in a clinical setting with deaf children.

While it is true that someone from the same language and cultural background as the child being assessed may elicit a more natural linguistic environment, it is not always possible to meet these conditions during the course of an assessment. In fact, in the case of deaf children, it is most often a speech-language pathologist who is called upon to complete the assessment. Ideally, the speech-language pathologist can work in conjunction with an ASL Specialist or a teacher of the deaf to provide a more thorough evaluation.

An additional limitation of using this type of instrument with sign language samples stems from the issue of on-line coding versus transcription. For the purpose of this study, the signed stories were transcribed using a system designed for capturing ASL in writing. The transcriptions served as the basis for the coding. Thus, the coding may have been susceptible to bias in the transcription, although both sets of transcriptions were coded by two separate raters and compared in an effort to ensure that rater bias was limited. In order to avoid this complication, it is recommended that the stories be coded directly from the videotapes. The accuracy of doing story structure analysis directly from sign language videotapes has not been investigated; thus this approach would have to be validated.

Direct coding of the stories from the videotapes was not used for this study, as there were no raters available to check the reliability of this method (i.e., there was no rater available for interrater reliability who was fluent in ASL and knowledgeable in the coding system). If the PSLI is to be used in assessing narrative skills of children who use ASL, a system should be established which eliminates the need for first transcribing the stories. This would also provide a more expedient means for evaluating the narratives.

Implications for Research

There were several findings with this data set that did not match the proposed hypotheses. First, while the children fell into two distinct groups based on their results (preschool/kindergarten aged and elementary-school aged), a developmental pattern across ages 6 to 11 was not found. If the sample was truly representative of the larger population, this result would suggest that the acquisition of story structure

is relatively static between these ages for this sample of deaf children. This finding is not consistent with other research studies with hearing children. However, as discussed earlier, this finding may well be sample-dependent. The small and inconsistent numbers within each age grouping may have influenced this result. A future study, with a larger number of children in each group, is necessary in order to evaluate the significance of this result. In addition, using multiple measures of language functioning would provide more information about the sample group.

A second divergent finding was in the lack of equivalence between the two forms of the instrument. Again, this finding may be unique to this subject pool. Alternatively, the two versions may truly differ in some respects. A larger-scale testing of the instrument would provide more insight into this finding. An alternative interpretation of this finding may indicate that although the two versions of the stories are not equivalent, there may be different skills that are being tapped into by the various stories. For example, the children in this study appeared to perform differently on story 1B as compared to the other stories. It may be that there is something is the structure of story 1B that targets a slightly different skill set than the other stories. As such, it may provide additional insights into the child's narrative abilities, particularly if the instrument is being used to collect criterion-related information. Certainly, additional studies using these stories are required to investigate these possibilities.

A factor that may have influenced the quantity of story grammar units produced was the researcher's familiarity with the picture stories. In this study, the children produced stories based on viewing a series of pictures. The researcher

presented the pictures to the children and thus they were aware of the researcher's knowledge of the stories. This fact, combined with the fact that the pictures were available for the children and the researcher to refer to while telling the stories, may have led to the assumption of shared knowledge on the part of the participants. Children may not have articulated certain parts of the stories as clearly as they might have with a naïve listener, with another child, or if the picture stimuli were not available. This hypothesis could be investigated using multiple stimulus conditions for eliciting the stories. Alternatively, the thinking used by the students could be probed retrospectively using a think aloud protocol analysis.

Another factor that may have influenced the production of story grammar units relates to the structure of the story stimuli. The stories within each series were designed to be related with respect to the characters and the setting of the stories. As such, the 2- and 3- episode stories may have been viewed by the children as extensions of the previous stories. While the order of administration of the stories was varied with respect to the two versions, the stories were always presented in increasing order of number of episodes. As such, there may have been some overlap between the stories, as well as some information that was omitted from stories on the assumption that the information was continued from the previous story. The stories could be considered as a unit of the three stories, rather than individually. This would be particularly relevant for certain types of analysis that are dependent on previously provided information such as referencing. Alternatively, the order of administration of the stories could also be varied such that the multi-episode stories are interspersed with the single episode stories.

An alternative way to deal with this issue would be to establish guidelines for a hierarchical administration of the stories. If the child's age and general language ability was taken into consideration, it may be possible to choose a starting point for administrating the stories, either with the single episode, the 2-episode, or the 3-episode story. If the child demonstrates a certain level of language competency, it may be worthwhile to start with one of the more complex stories, which would include the story grammar information that is gathered from the simpler stories, as well as the more complex episodic information. This would also streamline the test administration for some children.

Future Directions for Research

This study constituted the initial testing of the PSLI. As such, it provides a springboard for many directions of future research, both stemming from this existing database and as an impetus for new studies.

Current Database

A detailed analysis of story structure was completed with this data set. However, other potential analyses were not completed at this time. Within the realm of narrative study, cohesive ties, most specifically the use of references, would provide interesting additional information. However, it should be noted that analysis of reference in ASL is a complex issue, dealing with role shifting, pointing, eye gaze, and use of classifiers (Baker-Shenk & Cokely, 1980; Emmorey & Reilly, 1998). In addition, an evaluation of the story structure levels beyond the incomplete versus complete episode dichotomy that was used for this study would also provide useful information. It may be that differences in the children's performance were not

detected because the rating of episodic structure was not sensitive enough to distinguish important differences. Hughes et al. (1997) provide an interesting flowchart for this type of analysis. Holistic scoring is another possible avenue for investigation (Gillam, McFadden, & van Kleeck, 1995; Hughes, Radcliff, & Lehman, 1998).

Beyond the narrative analyses, this study also contains a rich database for the analysis of semantic and syntactic skills. Peer language samples were also collected from this sample of children. An analysis of these samples would provide a criterion measure for the PSLI.

Future Studies

As mentioned earlier, additional testing is necessary to establish the psychometric properties of the PSLI, particularly if it is to be used in assessment. Considerable evidence was provided for the content and construct validity. Criterion validity and reliability must be addressed. Criterion validity should be addressed by the use of additional instruments with established parameters. As this field of study expands, instruments will come available to permit this type of testing. Both convergent and divergent findings should be established.

Alternate raters and test-retest reliability of the PSLI should be pursued. The issue of raters is particularly important in the evaluation of children who are deaf and use sign language. Future studies addressing rater reliability should include raters who are deaf, native signers. Alternate forms reliability needs to be investigated further to establish if the differences found are unique to this study or reflective of a

true difference in the stimuli. In addition, the coding protocol developed through the course of this study should undergo more rigorous validity testing.

The children involved in the current study ranged in age from 4 to 11 years. Given that no differences were found within the school-aged group of children, it would be beneficial to extend the use of this instrument to children ages 12 to 14 years, to examine if differences emerge at a later stage.

Conclusions

The process used throughout the course of this project resulted in the creation of a useful instrument for collecting narrative information. While additional information is still required to establish the strength of the PSLI, a strong base has been established. In its current form, the PSLI can provide valuable information for research purposes. Additional validation and refinement of the instrument is necessary before the PSLI could be applied in a clinical setting. As additional information is collected, the need for modifications to the picture stimuli and the coding protocol may become apparent.

The original purpose for developing the PSLI was to provide a norm-referenced instrument for use with deaf children. It has become apparent through the course of this study that this tool may have applications beyond this original intention. The use of the PSLI as a norm-referenced assessment tool with the larger population of school-aged children is certainly possible. In addition, the PSLI provides a unique format for collecting criterion-related information about a child for use in an assessment setting.

Through the course of this study, the researcher observed that the PSLI might also have uses beyond testing. While its strength as a narrative assessment tool has been established, the PSLI may also be useful as a teaching/therapy tool. If deficits in narrative development have been identified, this instrument provides a systematic framework for developing these skills. Of course, the use of the PSLI as a teaching tool would impact its use with the same children as an assessment instrument. However, it may be that an appropriate use of the two forms of the instrument is to use one form for test-retest purposes and the second form as a teaching tool.

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Appendix A: Written Narratives and Picture Descriptions

Story 1A: George and Lizzy at the Swimming Pool

Characters: male giraffe; female elephant
Setting: swimming pool

Picture #	Sample Story	SG	Picture Description
1	One day George the Giraffe was at the swimming pool. His friend Lizzy the Elephant was there too. Lizzy was bouncing her ball.	SET	• giraffe (male) & elephant (female) standing around the swimming pool • elephant bouncing a ball • both have happy expressions
2	Suddenly, Lizzy's ball fell in the water. George wanted to get the ball for his friend. He decided to jump in the swimming pool.	IE IR IP	• ball floating in pool • giraffe standing at edge of pool, looking at ball in water; leaning slightly over water • elephant standing one step behind giraffe looking at ball as well
3	So George jumped in the water. He swam towards to ball.	A	• giraffe in water; swimming towards ball • elephant standing beside pool; looking at giraffe with worried expression
4	George got the ball. He swam to the side of the pool and gave the ball back to Lizzy.	C	• giraffe in pool, handing ball to elephant • elephant standing on side of pool, reaching for ball
5	Lizzy was happy to have her ball back. George was proud that he was able to help his friend.	R R	• giraffe standing beside the pool, dripping and looking proud • elephant looking happily at the giraffe, with the ball in her hands

Story 1B: Riley and Jackie in the Sandbox

Characters: male rabbit; female dog
Setting: park

Picture #	Sample Story	SG	Picture Description
1	One day Riley the Rabbit went to the park. His friend Jackie the Dog was there too.	SET	• rabbit (male) standing beside a sandbox in the park • dog (female) sitting in the sandbox, building a sandcastle • both have happy expressions
2	Jackie was building sandcastles in the sandbox. Riley wanted to help her. He decided to help Jackie make a really big sandcastle.	IE IR IP	• dog sitting in the sandbox, completing her sandcastle • rabbit, sitting beside dog filling a very big pail with sand, looking at the sandcastles
3	So he dumped a whole bunch of sand on her sandcastle. But he put too much sand on top.	A	• rabbit accidentally dumping a whole bunch of sand on the sandcastle • dog, watching the rabbit with a confused expression
4	The sandcastle got smashed into a million pieces.	C	• dog and rabbit, both staring at the smashed sandcastle in front of the dog • both have shocked expressions
5	Jackie was upset that her sandcastle was broken. Riley felt embarrassed about what he had done.	R R	• dog, staring at the pile of sand, crying, and trying to fix her sandcastle • rabbit, with an ashamed expression

Story 2A: Lizzy and George on the Pool Deck

Characters: female elephant; male giraffe; male elephant
Setting: swimming pool

Picture #	Sample Story	SG	Picture Description
1	One day Lizzy the Elephant and George the Giraffe went to the swimming pool.	SET	• elephant #1 (female) and giraffe (male) standing at the swimming pool with happy expressions • diving board in background
2	Lizzy saw the diving board. She wanted to jump off the board. She decided to run to the diving board.	IE IR IP	• elephant #1 pointing at the diving board, posed to start running towards it • giraffe looking at elephant #1
3	So, Lizzy started to run on the pool deck. The pool deck was slippery and she started to fall.	A	• elephant #1 running and starting to slip on the deck, with a panicked expression • giraffe following the elephant on the pool deck
4	She fell on the deck and scraped on her knee.	C	• elephant #1, fallen down on the pool deck with a scraped knee • giraffe running towards elephant #1
5	Lizzy was hurt and started to cry. George felt bad for his friend.	R R	• elephant #1 lying on the ground, holding onto her bleeding knee and crying • giraffe looking at the elephant with a concerned expression
6	Jim the Elephant lifeguard saw Lizzy on the ground. He thought that she needed some help. He decided to help Lizzy.	IE IR IP	• lifeguard elephant (male) walking towards the accident scene • elephant #1 still on the ground with the giraffe kneeling beside her
7	Jim went to help Lizzy to fix her sore knee.	A	• lifeguard elephant kneeling beside elephant #1, putting a Band-Aid on her knee • giraffe watching the 2 elephants

8	George and Jim helped Lizzy to go sit down.	C	• elephant #1 sitting down on a bench, with the giraffe and the lifeguard elephant helping her
9	Lizzy felt embarrassed for her accident. Jim the lifeguard told the friends that they should not run on the pool deck.	R R	• elephant #1 with an embarrassed expression • lifeguard elephant, with a stern expression, pointing at a "No Running" sign (sign with symbol for no running) • empty diving board in the background

Story 2B: Riley and Jackie Have a Picnic

Characters: male rabbit; female dog, female rabbit
Setting: park

Picture #	Sample Story	SG	Picture Description
1	One day Riley the Rabbit went to the park. His friend Jackie the Dog was there too. Riley and Jackie were going to have a picnic.	SET	• rabbit #1 (male) walking into park with a big picnic basket • dog (female) standing in park, also with picnic basket, waiting for the rabbit • both have happy expressions
2	Riley had lots of food in his picnic basket. He was very hungry. He wanted to eat his lunch. He decided to eat all of his food really fast.	IE IR IP	• rabbit #1 sitting with all of his food out of the basket (lots of food), starting to eat (hungry expression) • dog sitting, taking food out of basket (in background)
3	So he ate all of the food that was in his picnic basket.	A	• rabbit #1, sitting with his mouth full of food, surrounded by empty food wrappers/containers, looking stuffed • dog, starting to eat her lunch, looking at rabbit #1
4	Riley ate so much food that he got a stomachache.	C	• rabbit #1 sitting on the ground, holding his stomach, looking sick • dog eating her lunch and staring at her friend
5	He felt awful. Jackie was worried about her friend.	R R	• rabbit #1, still lying on the ground, looking sick • dog, beside rabbit #1, looking at him with a worried expression
6	Jackie saw Dr. Rosemary Rabbit across the park. She thought that the doctor could help Riley. She decided to go talk to the doctor.	IE IR IP	• doctor rabbit (female) standing in the park with a medical bag • dog approaching the doctor rabbit • rabbit #1, still lying on the ground looking sick (in background)
7	Jackie brought the doctor over to check Riley.	A	• dog pulling on doctor rabbit's sleeve, bringing her towards rabbit #1

8	The doctor checked Riley. She told him that he should go home and go to bed.	C	• doctor rabbit kneeling down beside rabbit #1, checking him and pointing out of the park • rabbit #1 sitting up, looking at doctor
9	Riley felt a little better having the doctor with him. Jackie was relieved that her friend was going to be all right.	R R	• doctor rabbit and rabbit #1 walking out of the park together • rabbit #1 looking a little better • dog watching them leave with a relieved expression

Story 3A: George's Airplane

Characters: 2 female elephants; male giraffe; male elephant
Setting: swimming pool

Picture #	Sample Story	SG	Picture Description
1	One day Lizzy the Elephant and George the Giraffe were at the swimming pool. George had a toy airplane.	SET	• elephant #1(female) and giraffe (male) standing at the swimming pool • giraffe holding a toy airplane • both have happy expressions
2	Lizzy saw George's toy airplane. She thought that it looked really neat. She decided to take it from George so that she could play with it.	IE IR IP	• giraffe playing with his toy airplane • elephant #1 looking longingly at the toy
3	So she tried to grab the toy airplane from George. George didn't want to give it to her.	A	• elephant #1 and giraffe struggling over the toy airplane
4	The toy airplane accidentally fell in the swimming pool. It was floating in the pool.	 C	• toy airplane floating in the pool • giraffe and elephant #1 staring at the toy airplane in the pool
5	George was very mad at Lizzy for dropping his toy airplane in the pool. Lizzy felt bad about what she had done.	R R	• giraffe glaring at elephant #1 with an angry expression • elephant #1 staring at the toy airplane with a worried expression
6	Then Lizzy saw Jim the Elephant lifeguard standing by the pool. She thought that maybe Jim could help them to get the toy airplane out of the pool. She decided to ask Jim for some help.	IE IR IP	• lifeguard elephant (male) standing on the pool deck, across the pool • elephant #1 looking and walking towards the lifeguard • giraffe in the background by elephant #1
7	Lizzy showed Jim the toy airplane in the water. She asked him if he could get it out.	A	• elephant #1 bringing lifeguard elephant to the side of the pool, pointing at the toy airplane • giraffe watching the toy airplane in the water

8	Jim tried to get the toy airplane out of the swimming pool. He could not reach the airplane because it was too far out.	C	• lifeguard elephant, kneeling by the side of the pool, reaching unsuccessfully for the toy • elephant #1 and giraffe watching the lifeguard elephant
9	George was still very upset with Lizzy. Lizzy felt bad about what she had done. Jim the lifeguard wasn't sure what to do about the toy airplane in the water.	R R	• giraffe staring at the toy airplane in the pool and crying • elephant #1 staring at the toy airplane with a sheepish expression • lifeguard elephant shrugging his shoulders, showing that he does not know what to do
10	Mrs. Elephant saw the toy airplane in the water. She thought that she could help Lizzy and George get the toy. She decided to go see if she could help.	IE IR IP	• elephant #3 (female)standing by the side of the pool with a large net bag (empty), looking at the toy airplane in the water • elephant #1, giraffe and lifeguard elephant standing by the pool staring at the toy airplane (background)
11	Mrs. Elephant scooped the toy airplane out of the swimming pool with her bag.	A	• elephant #3 scooping the toy airplane out of the pool with her bag • elephant #1, giraffe and lifeguard elephant watching
12	She gave the toy airplane back to George.	C	• elephant #3 giving the toy airplane to the giraffe • elephant #1 and lifeguard elephant watching
13	George was happy to have his toy airplane back. Lizzy felt relieved that her friend had his toy back.	R R	• giraffe has a happy expression • elephant #1 has a relieved expression • elephant #1, mother elephant and lifeguard elephant watching the giraffe with his toy airplane

Story 3B: Riley and Jackie Play with Balloons

Characters: 2 male rabbits; female dog, female rabbit
Setting: park

Picture #	Sample Story	SG	Picture Description
1	One day Riley the Rabbit went to the park. His friend Jackie the Dog was there too. Jackie had a big red balloon tied to her wagon.	SET	• rabbit #1(male) walking into park • dog(female) standing in park, with a balloon tied to her wagon • both have happy expressions
2	Riley saw Jackie's balloon. He wanted to play with it. He decided to untie the balloon.	IE IR IP	• rabbit #1 leaning towards the balloon, reaching for it • dog standing beside her wagon, watching rabbit #1
3	So he untied the balloon. He accidentally let go of the balloon.	A	• rabbit #1 untying the balloon • dog, staring at the balloon and rabbit #1 in shock
4	The balloon floated away.	C	• balloon floating away • rabbit #1 and dog reaching up towards the balloon (unsuccessfully)
5	Jackie was mad at Riley for losing her balloon. Riley felt ashamed about what he had done.	R R	• dog staring at rabbit #1 with an angry expression • rabbit #1 staring at the balloon, looking ashamed
6	Riley saw Curtis the Rabbit selling balloons in the park. He wanted to make Jackie feel better by getting her a new balloon. So, Riley decided to get a new balloon for Jackie from Curtis.	IE IR IP	• rabbit #2 (male), across the park selling balloons • rabbit #1, walking towards rabbit #2 • dog (in background), still looking angry
7	Riley asked Curtis for a balloon.	A	• rabbit #1 pointing to balloons • rabbit #2 holding balloons, looking at rabbit #1 • dog watching the 2 rabbits

8	But he didn't have any money, so Curtis wouldn't give him one.	C	• rabbit #2 with a stern expression, pointing to "Balloons - 5¢" sign (picture of balloon and 5¢) • rabbit #1 pulling out his pockets, showing that he has no money
9	Riley was disappointed that he couldn't get a new balloon. Jackie was sad that she still didn't have a balloon.	R R	• rabbit #1 and dog, standing with disappointed and sad expressions respectively • rabbit #2 standing beside them with his balloons
10	Then Riley saw Dr. Rosemary Rabbit in the park. He thought that Dr. Rabbit might be able to help him. So, he decided to ask her for some money to buy a balloon.	IE IR IP	• doctor rabbit (female) standing in the park • rabbit #1 approaches doctor rabbit • rabbit #2 with balloons and dog standing (background)
11	Riley asked Dr. Rabbit to buy some balloons.	A	• rabbit #1 beside doctor rabbit, pointing to balloons and showing that he has no money in his pockets • dog and rabbit #1 watching
12	Dr. Rabbit bought two balloons from Curtis. Jackie got a balloon and Riley also got a balloon.	C	• doctor rabbit giving money to rabbit #2 • rabbit #2 handing 1 balloon to rabbit #1 and 1 balloon to the dog
13	Riley and Jackie were happy to have brand new balloons. Dr. Rabbit was delighted that she was able to help the two friends.	C R R	• rabbit #1 and dog, each with a balloon, with happy expressions • doctor rabbit, looking at rabbit #1 and dog, with a pleased expression • rabbit #2 in background with his balloons

Appendix B: Narrative Panel Questionnaire #1

Information for the Panel Review of the Narrative Stories

The stories presented here will be used to develop picture stimuli for an instrument to be used to elicit narrative stories from children. The children targeted for the current study are deaf children ranging in age from 5 to 10 years.

Six stories are presented in the following package. These stories have been developed in order to have two sets of corresponding stories. The stories in each set are related in terms of the general setting and the characters involved. Corresponding stories (e.g., 1A and 1B, 2A and 2B, 3A and 3B) are similar in terms of the number of episodes and approximate length of the stories. Brief descriptions of the stories and the characters are provided below. Two sets of stories were developed such that the corresponding forms could be used as alternate forms for collecting data.

The prose stories that are presented are sample stories composed by the researchers. These sample stories will not be used with the subjects in this study. These stories, and the story scripts that accompany them will be used by an artist to develop picture story sequences. These picture sequences will be used to elicit the narrative stories from the subjects. In this study, the children will be presented a set of pictures for one story, asked to review all of the pictures, and then asked to tell a story from the pictures. This will be repeated with each picture sequence.

In this package, the stories and scripts are presented in tabular form, broken down by picture number in accordance to the pictures that will be developed. The question forms to be completed are presented on the opposing pages in this package. Some of the longer stories are presented on two pages. For a sense of cohesiveness, it may be helpful to review the entire story and story script before responding to the questions.

The stories and story scripts have been developed in accordance with the model of story grammar proposed by Stein and Glenn (1979)*. The following definitions were used as guidelines for labeling the various parts of the stories:

- Setting (SET): describes characters and physical and social context of the story.
- Initiating Event (IE): an event which causes a response in the main character
- Internal Response (IR): the psychological state of the character after the initiating event
- Internal Plan (IP): describes the character's plan for obtaining a desired goal
- Attempt (A): describes the character's actions used to obtain the goal
- Consequence (C): indicates the result of the character's attempt
- Reaction (R): describes the main character's reaction (and possibly the reaction of other characters) to the consequence

(* Stein, N. & Glenn, C. (1979). An analysis of story comprehension in elementary school children. In R. Freedle (ed.), New directions in discourse processing: Volume 2, Advances in discourse processing. Norwood, NJ: Ablex)

The stories presented contain the above-mentioned story elements. Internal responses and internal plans were included in all stories, although it is recognized that children's stories often do not include both of these elements. Stories contain 1, 2 or 3 episodes.

In analyzing the narratives for the present study, the following dimensions will be considered:

- story grammar elements - the presence of each element/episode (will be credited for the use of either IR or IP)
- number of complete episodes in terms of structural patterns
- aspects of cohesion within the stories
- syntactic and morphological analysis

Story Summaries:

The stories were developed with an attempt to control for the setting. Within each set of 3 stories, the stories increase in complexity in terms of the number of characters and the length of the stories. Complexity is also introduced by having characters that are the same gender and/or type of animal. An attempt has been made to use characters and settings with which most young children will be familiar.

Story	# of Episodes	Setting	# of Characters	Character Description
1A	1	swimming pool	2	• young female elephant • young male giraffe
2A	2	swimming pool	3	• young female elephant • young male giraffe • male elephant lifeguard (adult)
3A	3	swimming pool	4	• young female elephant • young male giraffe • male elephant lifeguard (adult) • adult female elephant
1B	1	park	2	• young male rabbit • young female dog
2B	2	park	3	• young male rabbit • young female dog • female rabbit doctor (adult)
3B	3	park	4	• rabbit • young female dog • female rabbit doctor (adult) • male rabbit who sells balloons (adult)

Story 1A: George and Lizzy Go Swimming

Characters: male giraffe; female elephant
Setting: swimming pool

Picture #	Sample Story	SG	Picture Description
1	One day George the Giraffe was at the swimming pool. His friend Lizzy the Elephant was there too.	SET	• giraffe (male) & elephant (female) standing around the swimming pool • both have happy expressions
2	George saw a ball floating in the water. He wanted to get the ball. He decided to jump in the swimming pool.	IE IR IP	• giraffe standing at edge of pool, looking longingly at ball in water; leaning slightly over water • elephant standing one step behind giraffe looking at him
3	So he jumped in the water. But he didn't know how to swim.	A	• giraffe in water; splashing and looking panicky • elephant standing beside pool; looking at giraffe with worried expression
4	He started to sink to the bottom of the pool. Lizzy the Elephant jumped in the water to save him. She dragged him out of the pool.	C	• giraffe at bottom of pool; looking very panicky • elephant diving into pool towards giraffe; determined expression
5	They were both safe. George was embarrassed. Lizzy was proud that she was able to help her friend.	R R	• giraffe and elephant standing beside the pool, both dripping • giraffe looks embarrassed • elephant looks proud

Story 1A: George and Lizzy Go Swimming

Picture #	Does this story adequately represent the story grammar elements as presented?
1 (SET)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
2 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
3 (A)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
4 (C)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
5 (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____

Does this story contain 1 episode? Yes _____ No _____
Comments:_____
_____
_____

Can this story be adequately depicted in 5 pictures? Yes _____ No _____
Comments:_____
_____
_____

Story 2A: Lizzy and George on the Pool Deck

Characters: female elephant; male giraffe; male elephant
Setting: swimming pool

Picture #	Sample Story	SG	Picture Description
1	One day Lizzy the Elephant and George the Giraffe went to the swimming pool.	SET	• elephant #1 (female) and giraffe (male) standing at the swimming pool with happy expressions • diving board in background
2	Lizzy saw the diving board. She wanted to jump off the board. She decided to run to the diving board.	IE IR IP	• elephant #1 pointing at the diving board, posed to start running towards it • giraffe looking at elephant #1
3	So, Lizzy started to run on the pool deck. The pool deck was slippery and she started to fall.	A	• elephant #1 running and starting to slip on the deck, with a panicked expression • giraffe following the elephant on the pool deck
4	She fell on the deck and scraped on her knee.	C	• elephant #1, fallen down on the pool deck with a scraped knee • giraffe running towards elephant #1
5	Lizzy was hurt and started to cry. George felt bad for his friend.	R R	• elephant #1 lying on the ground, holding onto her bleeding knee and crying • giraffe looking at the elephant with a concerned expression
6	Jim the Elephant lifeguard saw Lizzy on the ground. He thought that she needed some help. He decided to help Lizzy.	IE IR IP	• lifeguard elephant (male) walking towards the accident scene • elephant #1 still on the ground with the giraffe kneeling beside her
7	Jim went to help Lizzy to fix her sore knee.	A	• lifeguard elephant kneeling beside elephant #1, putting a Band-Aid on her knee • giraffe watching the 2 elephants

8	George and Jim helped Lizzy to go sit down.	C	• elephant #1 sitting down on a bench, with the giraffe and the lifeguard elephant helping her
9	Lizzy felt embarrassed for her accident. Jim the lifeguard told the friends that they should not run on the pool deck.	R R	• elephant #1 with an embarrassed expression • lifeguard elephant, with a stern expression, pointing at a "No Running" sign (sign with symbol for no running) • empty diving board in the background

Story 2A: Lizzy and George on the Pool Deck

Picture #	Does this story adequately represent the story grammar elements as presented?
1 (SET)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
2 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
3 (A)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
4 (C)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
5 (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
6 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
7 (A)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____

8 (C) (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____

Does this story contain 2 episodes? Yes _____ No _____
Comments:_____
_____
_____
_____

Can this story be adequately depicted in 8 pictures? Yes _____ No _____
Comments:_____
_____
_____
_____

Story 3A: George's Airplane

Characters: 2 female elephants; male giraffe; male elephant
Setting: swimming pool

Picture #	Sample Story	SG	Picture Description
1	One day Lizzy the Elephant and George the Giraffe were at the swimming pool. George had a toy airplane.	SET	• elephant #1(female) and giraffe (male) standing at the swimming pool • giraffe holding a toy airplane • both have happy expressions
2	Lizzy saw George's toy airplane. She thought that it looked really neat. She decided to take it from George so that she could play with it.	IE IR IP	• giraffe playing with his toy airplane • elephant #1 looking longingly at the toy
3	So she tried to grab the toy airplane from George. George didn't want to give it to her.	A	• elephant #1 and giraffe struggling over the toy airplane
4	The toy airplane accidentally fell in the swimming pool. It was floating in the pool.	 C	• toy airplane floating in the pool • giraffe and elephant #1 staring at the toy airplane in the pool
5	George was very mad at Lizzy for dropping his toy airplane in the pool. Lizzy felt bad about what she had done.	R R	• giraffe glaring at elephant #1 with an angry expression • elephant #1 staring at the toy airplane with a worried expression
6	Then Lizzy saw Jim the Elephant lifeguard standing by the pool. She thought that maybe Jim could help them to get the toy airplane out of the pool. She decided to ask Jim for some help.	IE IR IP	• lifeguard elephant (male) standing on the pool deck, across the pool • elephant #1 looking and walking towards the lifeguard • giraffe in the background by elephant #1
7	Lizzy showed Jim the toy airplane in the water. She asked him if he could get it out.	A	• elephant #1 bringing lifeguard elephant to the side of the pool, pointing at the toy airplane • giraffe watching the toy airplane in the water

8	Jim tried to get the toy airplane out of the swimming pool. He could not reach the airplane because it was too far out.	C	• lifeguard elephant, kneeling by the side of the pool, reaching unsuccessfully for the toy • elephant #1 and giraffe watching the lifeguard elephant
9	George was still very upset with Lizzy. Lizzy felt bad about what she had done. Jim the lifeguard wasn't sure what to do about the toy airplane in the water.	R R	• giraffe staring at the toy airplane in the pool and crying • elephant #1 staring at the toy airplane with a sheepish expression • lifeguard elephant shrugging his shoulders, showing that he does not know what to do
10	Mrs. Elephant saw the toy airplane in the water. She thought that she could help Lizzy and George get the toy. She decided to go see if she could help.	IE IR IP	• elephant #3 (female)standing by the side of the pool with a large net bag (empty), looking at the toy airplane in the water • elephant #1, giraffe and lifeguard elephant standing by the pool staring at the toy airplane (background)
11	Mrs. Elephant scooped the toy airplane out of the swimming pool with her bag.	A	• elephant #3 scooping the toy airplane out of the pool with her bag • elephant #1, giraffe and lifeguard elephant watching
12	She gave the toy airplane back to George.	C	• elephant #3 giving the toy airplane to the giraffe • elephant #1 and lifeguard elephant watching
13	George was happy to have his toy airplane back. Lizzy felt relieved that her friend had his toy back.	R R	• giraffe has a happy expression • elephant #1 has a relieved expression • elephant #1, mother elephant and lifeguard elephant watching the giraffe with his toy airplane

Story 3A: George's Airplane

Picture #	Does this story adequately represent the story grammar elements as presented?
1 (SET)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
2 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
3 (A)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
4 (C)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
5 (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
6 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
7 (A) (C)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____

8 (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
9 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
10 (A) (C)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
11 (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____

Does this story contain 3 episodes? Yes _____ No _____
Comments:_____
_____
_____
_____

Can this story be adequately depicted in 11 pictures? Yes _____ No _____
Comments:_____
_____
_____
_____

Story 1B: Riley and Jackie in the Sandbox

Characters: male rabbit; female dog
Setting: park

Picture #	Sample Story	SG	Picture Description
1	One day Riley the Rabbit went to the park. His friend Jackie the Dog was there too.	SET	• rabbit (male) standing beside a sandbox in the park • dog (female) sitting in the sandbox, building a sandcastle • both have happy expressions
2	Jackie was building sandcastles in the sandbox. Riley wanted to help her. He decided to help Jackie make a really big sandcastle.	IE IR IP	• dog sitting in the sandbox, completing her sandcastle • rabbit, sitting beside dog filling a very big pail with sand, looking at the sandcastles
3	So he dumped a whole bunch of sand on her sandcastle. But he put too much sand on top.	A	• rabbit accidentally dumping a whole bunch of sand on the sandcastle • dog, watching the rabbit with a confused expression
4	The sandcastle got smashed into a million pieces.	C	• dog and rabbit, both staring at the smashed sandcastle in front of the dog • both have shocked expressions
5	Jackie was upset that her sandcastle was broken. Riley felt embarrassed about what he had done. He tried to fix the sandcastle.	R R	• dog, staring at the pile of sand, crying • rabbit, with an ashamed expression, trying to fix the sandcastle

Story 1B: Riley and Jackie in the Sandbox

Picture #	Does this story adequately represent the story grammar elements as presented?
1 (SET)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
2 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
3 (A)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
4 (C)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
5 (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____

Does this story contain 1 episode? Yes _____ No _____
Comments:_____
_____
_____

Can this story be adequately depicted in 5 pictures? Yes _____ No _____
Comments:_____
_____
_____

Story 2B: Riley and Jackie Have a Picnic

Characters: male rabbit; female dog, female rabbit
Setting: park

Picture #	Sample Story	SG	Picture Description
1	One day Riley the Rabbit went to the park. His friend Jackie the Dog was there too. Riley and Jackie were going to have a picnic.	SET	• rabbit #1 (male) walking into park with a big picnic basket • dog (female) standing in park, also with picnic basket, waiting for the rabbit • both have happy expressions
2	Riley had lots of food in his picnic basket. He was very hungry. He wanted to eat his lunch. He decided to eat all of his food really fast.	 IE IR IP	• rabbit #1 sitting with all of his food out of the basket (lots of food), starting to eat (hungry expression) • dog sitting, taking food out of basket (in background)
3	So he ate all of the food that was in his picnic basket.	A	• rabbit #1, sitting with his mouth full of food, surrounded by empty food wrappers/containers, looking stuffed • dog, starting to eat her lunch, looking at rabbit #1
4	Riley ate so much food that he got a stomachache.	C	• rabbit #1 sitting on the ground, holding his stomach, looking sick • dog eating her lunch and staring at her friend
5	He felt awful. Jackie was worried about her friend.	R R	• rabbit #1, still lying on the ground, looking sick • dog, beside rabbit #1, looking at him with a worried expression
6	Jackie saw Dr. Rosemary Rabbit across the park. She thought that the doctor could help Riley. She decided to go talk to the doctor.	IE IR IP	• doctor rabbit (female) standing in the park with a medical bag • dog approaching the doctor rabbit • rabbit #1, still lying on the ground looking sick (in background)
7	Jackie brought the doctor over to check Riley.	A	• dog pulling on doctor rabbit's sleeve, bringing her towards rabbit #1

8	The doctor checked Riley. She told him that he should go home and go to bed.	C	• doctor rabbit kneeling down beside rabbit #1, checking him and pointing out of the park • rabbit #1 sitting up, looking at doctor
9	Riley felt a little better having the doctor with him. Jackie was relieved that her friend was going to be all right.	R R	• doctor rabbit and rabbit #1 walking out of the park together • rabbit #1 looking a little better • dog watching them leave with a relieved expression

Story 2B: Riley and Jackie Have a Picnic

Picture #	Does this story adequately represent the story grammar elements as presented?
1 (SET)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
2 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
3 (A)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
4 (C)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
5 (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
6 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
7 (A) (C)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____

8 (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____

Does this story contain 2 episodes? Yes _____ No _____
Comments:_____
_____
_____
_____

Can this story be adequately depicted in 8 pictures? Yes _____ No _____
Comments:_____
_____
_____
_____

Story 3B: Riley and Jackie Play with Balloons

Characters: 2 male rabbits; female dog, female rabbit
Setting: park

Picture #	Sample Story	SG	Picture Description
1	One day Riley the Rabbit went to the park. His friend Jackie the Dog was there too. Jackie had a big red balloon tied to her wagon.	SET	• rabbit #1(male) walking into park • dog(female) standing in park, with a balloon tied to her wagon • both have happy expressions
2	Riley saw Jackie's balloon. He wanted to play with it. He decided to untie the balloon.	IE IR IP	• rabbit #1 leaning towards the balloon, reaching for it • dog standing beside her wagon, watching rabbit #1
3	So he untied the balloon. He accidentally let go of the balloon.	A	• rabbit #1 untying the balloon • dog, staring at the balloon and rabbit #1 in shock
4	The balloon floated away.	C	• balloon floating away • rabbit #1 and dog reaching up towards the balloon (unsuccessfully)
5	Jackie was mad at Riley for losing her balloon. Riley felt ashamed about what he had done.	R R	• dog staring at rabbit #1 with an angry expression • rabbit #1 staring at the balloon, looking ashamed
6	Riley saw Curtis the Rabbit selling balloons in the park. He wanted to make Jackie feel better by getting her a new balloon. So, Riley decided to get a new balloon for Jackie from Curtis.	IE IR IP	• rabbit #2 (male), across the park selling balloons • rabbit #1, walking towards rabbit #2 • dog (in background), still looking angry
7	Riley asked Curtis for a balloon.	A	• rabbit #1 pointing to balloons • rabbit #2 holding balloons, looking at rabbit #1 • dog watching the 2 rabbits

8	But he didn't have any money, so Curtis wouldn't give him one.	C	• rabbit #2 with a stern expression, pointing to "Balloons - 5¢" sign (picture of balloon and 5¢) • rabbit #1 pulling out his pockets, showing that he has no money
9	Riley was disappointed that he couldn't get a new balloon. Jackie was sad that she still didn't have a balloon.	R R	• rabbit #1 and dog, standing with disappointed and sad expressions respectively • rabbit #2 standing beside them with his balloons
10	Then Riley saw Dr. Rosemary Rabbit in the park. He thought that Dr. Rabbit might be able to help him. So, he decided to ask her for some money to buy a balloon.	IE IR IP	• doctor rabbit (female) standing in the park • rabbit #1 approaches doctor rabbit • rabbit #2 with balloons and dog standing (background)
11	Riley asked Dr. Rabbit to buy some balloons.	A	• rabbit #1 beside doctor rabbit, pointing to balloons and showing that he has no money in his pockets • dog and rabbit #1 watching
12	Dr. Rabbit bought two balloons from Curtis. Jackie got a balloon and Riley also got a balloon.	C	• doctor rabbit giving money to rabbit #2 • rabbit #2 handing 1 balloon to rabbit #1 and 1 balloon to the dog
13	Riley and Jackie were happy to have brand new balloons. Dr. Rabbit was delighted that she was able to help the two friends.	C R R	• rabbit #1 and dog, each with a balloon, with happy expressions • doctor rabbit, looking at rabbit #1 and dog, with a pleased expression • rabbit #2 in background with his balloons

Story 3B: Riley and Jackie Play with Balloons

Picture #	Does this story adequately represent the story grammar elements as presented?
1 (SET)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
2 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
3 (A)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
4 (C)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
5 (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
6 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
7 (A) (C)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____

8 (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
9 (IE) (IR) (IP)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
10 (A)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____
11 (C) (R)	Yes _____ No _____ If no, what should be changed, added, deleted? _____ _____

Does this story contain 3 episodes? Yes _____ No _____
Comments:_____
_____
_____
_____

Can this story be adequately depicted in 11 pictures? Yes _____ No _____
Comments:_____
_____
_____
_____

Appendix C: Picture Stories

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Story 1A

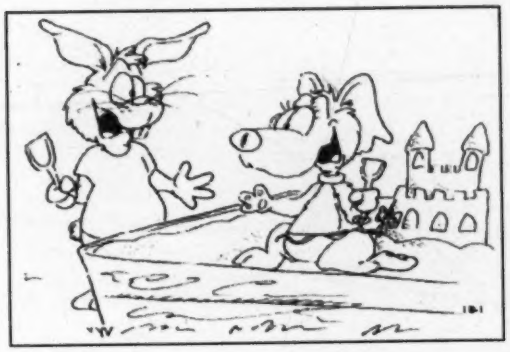
Story 2A

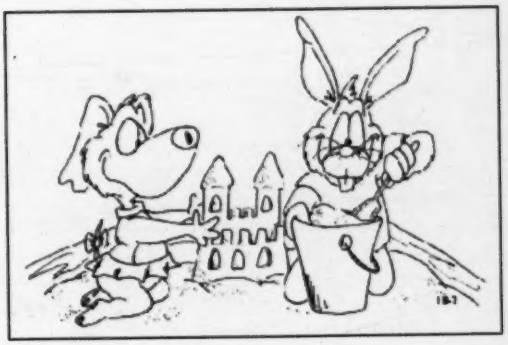
NO RUNNING
NO RUNNING
NO RUNNING
NO RUNNING
NO RUNNING
NO RUNNING
NO RUNNING
NO RUNNING

Story 3A

Story 3A (continued)

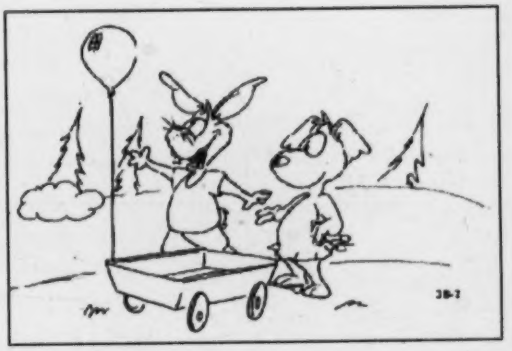
Story 1B

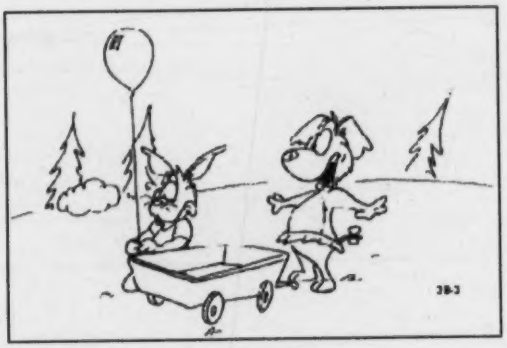


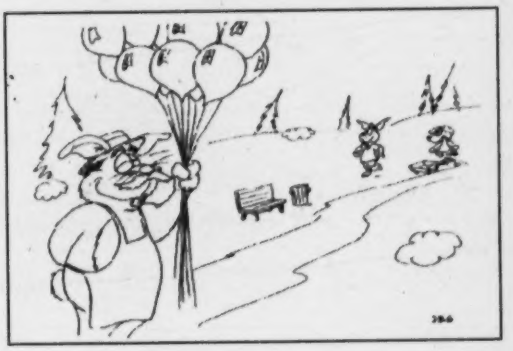


Story 2B

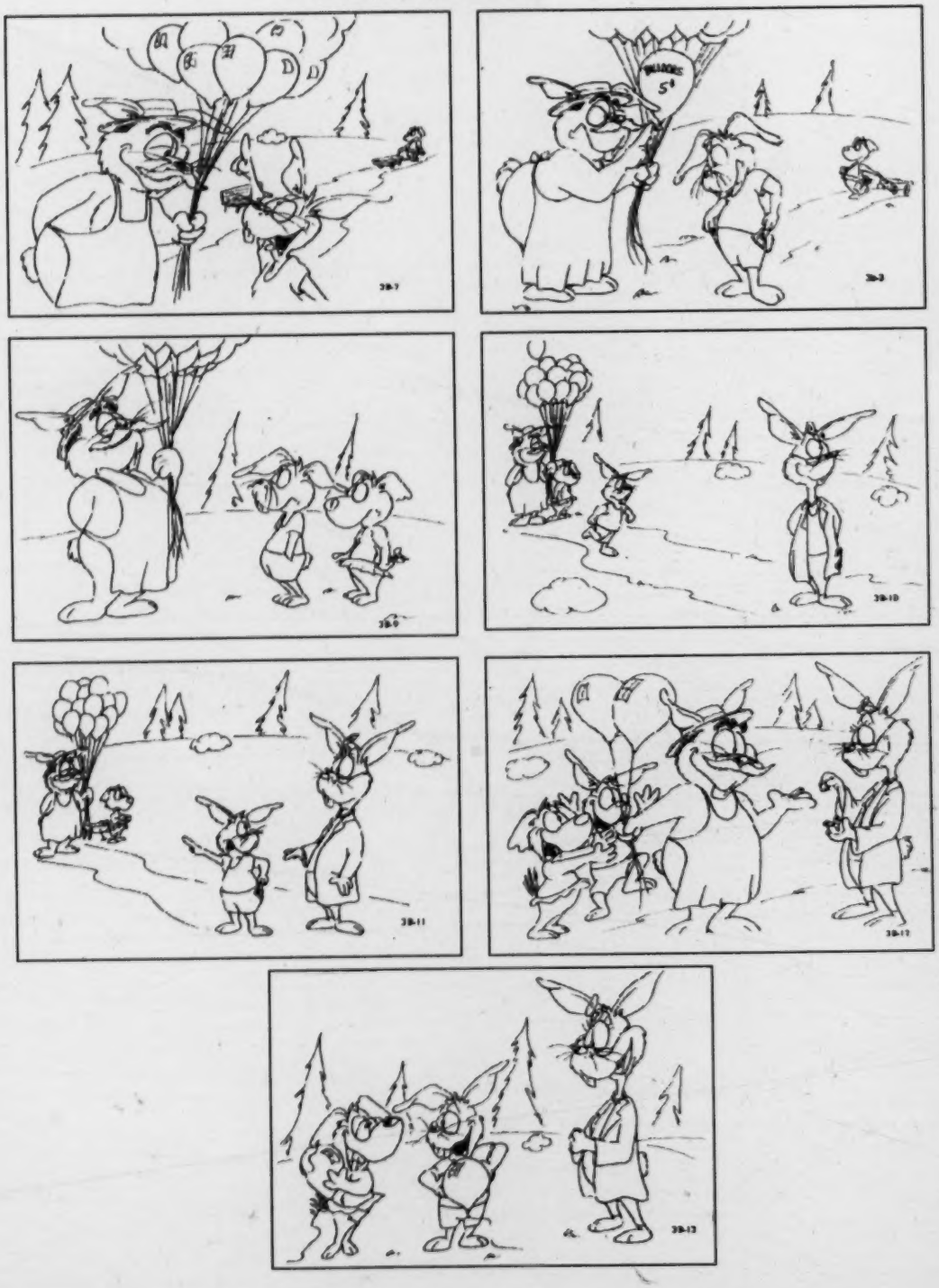
Story 3B







Story 3B (continued)



Appendix D: Narrative Panel Questionnaire #2

Information for the Panel Review of the Picture Sequences

The picture sequences that are presented here will be used as stimuli to elicit stories from children. The children targeted for the current study are deaf children ranging in age from 5 to 10 years. The children will be presented a set of pictures for one story, asked to review all of the pictures, and then asked to tell a story from the pictures. This will be repeated with each picture sequence.

Six picture sequences are presented in the following package. These stories have been developed in order to have two sets of corresponding stories. The stories in each set are related in terms of the general setting and the characters involved. Corresponding stories (e.g., 1A and 1B, 2A and 2B, 3A and 3B) are similar in terms of the number of pictures and the number of episodes presented. Brief descriptions of the stories and the characters are provided below. Two sets of stories were developed such that the corresponding forms could be used as alternate forms for collecting data.

A question form accompanies each picture sequence. Please respond to the questions as they relate to that picture sequence.

The picture sequences are based on stories that were developed in accordance with the model of story grammar proposed by Stein and Glenn (1979)*. The following definitions were used as guidelines for labeling the various parts of the stories:

Setting (SET): describes characters and physical and social context of the story:

- Initiating Event (IE): an event which causes a response in the main character
- Internal Response (IR): the psychological state of the character after the initiating event
- Internal Plan (IP): describes the character's plan for obtaining a desired goal
- Attempt (A): describes the character's actions used to obtain the goal
- Consequence (C): indicates the result of the character's attempt
- Reaction (R): describes the main character's reaction (and possibly the reaction of other characters) to the consequence

(* Stein, N. & Glenn, C. (1979). An analysis of story comprehension in elementary school children. In R. Freedle (ed.), New directions in discourse processing: Volume 2, Advances in discourse processing. Norwood, NJ: Ablex)

The picture stories presented contain the above-mentioned story elements. Internal responses and internal plans were included in all stories, although it is recognized that children's stories often do not include both of these elements. Stories contain one, two or three episodes.

In analyzing the children's stories for the present study, the following dimensions will be considered:

- story grammar elements - the presence of each element/episode (will be credited for the use of either IR or IP)
- number of complete episodes in terms of structural patterns
- aspects of cohesion within the stories
- syntactic and morphological analysis

Story Summaries:

The picture stories were developed with an attempt to control for the setting. Within each set of 3 stories, the stories increase in complexity in terms of the number of characters and the length of the stories. Complexity is also introduced by having characters that are the same gender and/or type of animal. An attempt has been made to use characters and settings with which most young children will be familiar.

Story	# of Episodes	Setting	# of Characters	Character Description
1A	1	swimming pool	2	• young female elephant • young male giraffe
2A	2	swimming pool	3	• young female elephant • young male giraffe • male elephant lifeguard (adult)
3A	3	swimming pool	4	• young female elephant • young male giraffe • male elephant lifeguard (adult) • adult female elephant
1B	1	park	2	• young male rabbit • young female dog
2B	2	park	3	• young male rabbit • young female dog • female rabbit doctor (adult)
3B	3	park	4	• rabbit • young female dog • female rabbit doctor (adult) • adult male rabbit who sells balloons

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf.

Story 1A

1. Does this picture sequence provide an opportunity to elicit a story which contains the following story grammar elements:

Setting	Yes _____	No _____
Initiating Event	Yes _____	No _____
Internal Response OR Internal Plan	Yes _____	No _____
Attempt	Yes _____	No _____
Consequence	Yes _____	No _____
Reaction	Yes _____	No _____

COMMENTS:_____
_____
_____
_____

2. Does this picture sequence provide an opportunity to elicit a story that contains one complete episode?

Yes _____ No _____

COMMENTS:_____
_____
_____
_____

3. Could children* use these pictures to tell a comprehensible story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____
_____

Story 1B

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf.

1. Does this picture sequence provide an opportunity to elicit a story which contains the following story grammar elements:

Setting	Yes _____	No _____
Initiating Event	Yes _____	No _____
Internal Response OR Internal Plan	Yes _____	No _____
Attempt	Yes _____	No _____
Consequence	Yes _____	No _____
Reaction	Yes _____	No _____

COMMENTS:_____
_____
_____
_____

2. Does this picture sequence provide an opportunity to elicit a story that contains one complete episode?

Yes _____ No _____

COMMENTS:_____
_____
_____
_____

3. Could children* use these pictures to tell a comprehensible story?

1 2 3 4 5
Not at all Very well

COMMENTS:_____
_____
_____
_____

Story 2A

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf.

1. Does this picture sequence provide an opportunity to elicit a story which contains the following story grammar elements:

Setting	Yes _____	No _____
Initiating Event	Yes _____	No _____
Internal Response OR Internal Plan	Yes _____	No _____
Attempt	Yes _____	No _____
Consequence	Yes _____	No _____
Reaction	Yes _____	No _____

COMMENTS:_____
_____
_____
_____

2. Does this picture sequence provide an opportunity to elicit a story that contains two complete episodes?

Yes _____ No _____

COMMENTS:_____
_____
_____
_____

3. Could children* use these pictures to tell a comprehensible story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____
_____

Story 2B

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf.

1. Does this picture sequence provide an opportunity to elicit a story which contains the following story grammar elements:

Setting	Yes _____	No _____
Initiating Event	Yes _____	No _____
Internal Response OR Internal Plan	Yes _____	No _____
Attempt	Yes _____	No _____
Consequence	Yes _____	No _____
Reaction	Yes _____	No _____

COMMENTS:_____
_____
_____
_____

2. Does this picture sequence provide an opportunity to elicit a story that contains two complete episodes?

Yes _____ No _____

COMMENTS:_____
_____
_____
_____

3. Could children* use these pictures to tell a comprehensible story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____
_____

Story 3A

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf.

1. Does this picture sequence provide an opportunity to elicit a story which contains the following story grammar elements:

Setting	Yes _____	No _____
Initiating Event	Yes _____	No _____
Internal Response OR Internal Plan	Yes _____	No _____
Attempt	Yes _____	No _____
Consequence	Yes _____	No _____
Reaction	Yes _____	No _____

COMMENTS:_____
_____
_____
_____

2. Does this picture sequence provide an opportunity to elicit a story that contains three complete episodes?

Yes _____ No _____

COMMENTS:_____
_____
_____
_____

3. Could children* use these pictures to tell a comprehensible story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____
_____

Story 3B

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf.

1. Does this picture sequence provide an opportunity to elicit a story which contains the following story grammar elements:

Setting	Yes _____	No _____
Initiating Event	Yes _____	No _____
Internal Response OR Internal Plan	Yes _____	No _____
Attempt	Yes _____	No _____
Consequence	Yes _____	No _____
Reaction	Yes _____	No _____

COMMENTS:_____
_____
_____
_____

2. Does this picture sequence provide an opportunity to elicit a story that contains three complete episodes?

Yes _____ No _____

COMMENTS:_____
_____
_____
_____

3. Could children* use these pictures to tell a comprehensible story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____
_____

Appendix E: Deaf Children Panel Questionnaire

Information for the Panel Review of the Picture Sequences

The picture sequences that are presented here will be used as stimuli to elicit stories from children. The children targeted for the current study are deaf children ranging in age from 5 to 10 years.

In the current study, the children will be presented a set of pictures for one story, asked to review all of the pictures, and then asked to tell a story from the pictures. This will be repeated with each picture sequence. The children will be encouraged to use the language with which they are most comfortable communicating to tell the stories (e.g., American Sign Language or English).

Six picture sequences are presented in the following package. These stories have been developed in order to have two sets of corresponding stories. The stories in each set are related in terms of the general setting and the characters involved. Corresponding stories (e.g., 1A and 1B, 2A and 2B, 3A and 3B) are similar in terms of the number of pictures and the number of episodes presented. Brief descriptions of the stories and the characters are provided below. Two sets of stories were developed such that the corresponding forms could be used as alternate forms for collecting data.

A question form accompanies each picture sequence. Please respond to the questions as they relate to that picture sequence.

For the purposes of this study, the children's stories will be analyzed across the following dimensions will be considered:

- vocabulary/semantic analysis
- syntactic and morphological analysis
- holistic story presentation
- narrative aspects (e.g., story grammar elements, episodic structure, cohesion)

Summary of the Story Content:

The picture stories were developed with an attempt to control for the setting. Within each set of 3 stories, the stories increase in complexity in terms of the number of characters and the length of the stories. Complexity is also introduced by having characters that are the same gender and/or type of animal. An attempt has been made to use characters and settings with which most young children will be familiar.

Story	# of Episodes	Setting	# of Characters	Character Description
1A	1	swimming pool	2	• young female elephant • young male giraffe
2A	2	swimming pool	3	• young female elephant • young male giraffe • male elephant lifeguard (adult)
3A	3	swimming pool	4	• young female elephant • young male giraffe • male elephant lifeguard (adult) • adult female elephant
1B	1	park	2	• young male rabbit • young female dog
2B	2	park	3	• young male rabbit • young female dog • female rabbit doctor (adult)
3B	3	park	4	• rabbit • young female dog • female rabbit doctor (adult) • adult male rabbit who sells balloons

Story 1A

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf or hard of hearing.

1. Will this picture story be appealing to children*?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

2. Will children* be familiar with the characters of this story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

3. Will children* be familiar with the setting of this story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

4. Could children* use these pictures to tell a comprehensible story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

Story 1B

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf or hard of hearing.

1. Will this picture story be appealing to children*?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

2. Will children* be familiar with the characters of this story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

3. Will children* be familiar with the setting of this story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

4. Could children* use these pictures to tell a comprehensible story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

Story 2A

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf or hard of hearing.

1. Will this picture story be appealing to children*?

1 2 3 4 5
Not at all Very well

COMMENTS:_____
_____
_____

2. Will children* be familiar with the characters of this story?

1 2 3 4 5
Not at all Very well

COMMENTS:_____
_____
_____

3. Will children* be familiar with the setting of this story?

1 2 3 4 5
Not at all Very well

COMMENTS:_____
_____
_____

4. Could children* use these pictures to tell a comprehensible story?

1 2 3 4 5
Not at all Very well

COMMENTS:_____
_____
_____

Story 2B

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf or hard of hearing.

1. Will this picture story be appealing to children*?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

2. Will children* be familiar with the characters of this story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

3. Will children* be familiar with the setting of this story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

4. Could children* use these pictures to tell a comprehensible story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

Story 3A

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf or hard of hearing.

1. Will this picture story be appealing to children*?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

2. Will children* be familiar with the characters of this story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

3. Will children* be familiar with the setting of this story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

4. Could children* use these pictures to tell a comprehensible story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

Story 3B

* for the purposes of this study, the children are between the ages of 5 and 10 years and are deaf or hard of hearing.

1. Will this picture story be appealing to children*?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

2. Will children* be familiar with the characters of this story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

3. Will children* be familiar with the setting of this story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

4. Could children* use these pictures to tell a comprehensible story?

1	2	3	4	5
Not at all				Very well

COMMENTS:_____
_____
_____

Appendix F: Adults Consent and Information Form

SUBJECT CONSENT FORM (ADULT)

Title: Development of the Picture Story Language Instrument for Deaf Children

Researchers: Rita Vis Dubé, Doctoral student, Faculty of Rehabilitation Medicine (905-707-1970), Phyllis Schneider and Gary Holdgrafer, Department of Speech Pathology, University of Alberta (403-492-5990)

The purpose of this study is to develop a way to describe the language skills of deaf children. You are being asked to participate in this portion of the study to determine if the pictures are adequate for telling stories in either English or American Sign Language (ASL).

You will be shown several series of pictures. I will ask you to tell me a story from the pictures. The stories will be videotaped. The videotaped stories will be analyzed to judge the adequacy of the pictures for telling stories. These videotapes will be saved and possibly used for future analysis.

We hope that the results of this study will help educators to provide the best programs possible for deaf children.

Only the researchers will have access to the information you provide, including the videotapes. Your name will not be used in any of the final results of these study or future studies of this information. You will be provided with a summary of the results of this study, if you wish.

If you have any questions about this study, please contact any of the investigators at the above phone numbers.

****

I have read this form and understand the purpose and procedures for this study. I understand that I may withdraw my consent to participate at any time. I have received a copy of this form.

Participant's Name: _____ Date: _____

Signature: _____ Primary Investigator: _____

PICTURE STORY LANGUAGE INSTRUMENT RESEARCH STUDY

SUBJECT QUESTIONNAIRE

Thank you for participating in this study. In order to analyze the information collected, we need to have some information about you. All of this information will be kept confidential. Your name will not be used for any purpose in this study.

NAME: _____

ADDRESS: _____

_____

AGE: _____

SEX: **MALE** _____ **FEMALE** _____

OCCUPATION: _____

HIGHEST LEVEL OF EDUCATION: _____

LANGUAGE USED FOR EVERYDAY COMMUNICATION: _____

OTHER LANGUAGES USED: _____

****

Information collected by: Rita Vis Dubé, Doctoral Candidate, University of Alberta

Date Collected: _____

Appendix G: Interview with Subject A5

Retrospective Protocol Analysis (Subject A5)

(translated from ASL)

Q If you were telling a story to kids in ASL, how would it be similar or different from these stories?

I often tell stories to young children, stories the same as in books, fairy tales for example. I tell the stories in ASL to the children, show them the book, then expand on it, adding more to expand on the story. I enhance the story. The books themselves are very dependent on sound. For example, "North Inuvik", a story from the north, talks about the sound of the wind. The Deaf don't hear the wind, they feel it. So, I change it to connect to the Deaf experience. Hearing people hear things, Deaf people feel things. Also, different ways, for example, I look at the picture and read the English sentence. Then I translate it to ASL to capture the meaning. I try to find an equivalent in the Deaf world, so that the children can feel a connection to the story. Also, after I finish telling the story, I put the book aside and tell the story as it would really happen in the Deaf world. The Deaf children are fascinated.

Q Like what?

Like my own connection to Deaf heritage. Also, often after I finish telling the story, the children will ask "What are the other connections for the Deaf?" They have, and then we add and add.

I try to stay away from rhymes -- they're really based on sound. They're always rhythmic and the Deaf aren't really interested, they don't get it, so I avoid those stories. I tell stories for any age group. For children ages 5 to 7 or 8, fairy tales; for ages 9 to 11 or 12, true stories, scary, funny -- they find them fascinating. For teenagers, I tell real life stories, based on fact, real life. They also love ghost stories, as well as detective mysteries -- really a wide range. Even Deaf adults in the community discuss stories. We discuss what's happening in the world, politics, different theories and philosophies, all sorts of different things.

Q Again focusing on young children, ages 4-6, do you think the order of the stories, the way that you tell them, is different? For example, with fairy tales, do you follow the same pattern? Or like these books, they have page 1, page 2, etc., do you follow the same structure, or would you change it for ASL?

For most stories, they would be the same. For example, "Goldilocks and the 3 Bears". The story would be the same, but I would make it longer, embellish it in ASL. I would use classifiers and spatial elements of ASL to tell the story rather than just telling the story in English word order. I would also make it more animated, add actions for what Goldilocks is doing and what she looks like. The Deaf children like the elaborations, they're fascinated by it. They like the facial expressions and the

body movement, not just the plain story with no expression. They think that's boring. With the action, they feel like they're involved in the story.

Q But the meaning of the story, that stays the same, right? For example, in the "3 Bears", the problem in the story is that she eats the food and breaks the chair and sleeps in the bed, that's stays the same?

No, I don't change the point of the story. I only change the presentation, to make it more ASL, more 3D. So I emphasize a point, and then expand on it.

Q When I asked hearing adults to tell these stories, they usually name the characters in the stories, for example, Elly the Elephant or Homer the Horse. Would that be the same in stories told in ASL?

No, I would just look at the picture and give it a label, based on the shape of the picture, what it looked like. So, I would just identify it as an elephant, that's all. I don't really care about the names. Really, the names are used because of how they sound. The Deaf have a strong connection to the visual aspects, how they see the world. They know that if I look at the picture and call it a horse, then that is a clear picture for them. The names themselves mean nothing for the Deaf.

Q I just was curious about that. Thank you.

My pleasure.

Q Your role here at the school is to do ASL assessment? For all of the students?

For new students entering the school, I observe them to determine their skills in ASL -- do they know alot or a little. Most students that come in here use signed English or manually coded English. I use a checklist and observe for about 1 hour.

Q If the students need help with ASL, what do you do to encourage them. Do you teach ASL?

I encourage them to socialize. I also teach. On Mondays and Wednesdays, I teach the teachers about the linguistics of ASL. I teach about the semantics, morphology, phonology and syntax of the language, the structure of the language. The teachers want to become bilingual, in ASL and English. They're trying. I came here 2 years ago, and things are moving along.

Q Thanks -- one last question. I had a form that I asked the teachers to fill out, and for the question about the language used in the classroom, several of them said that they use "CASE" in the classroom. What does that stand for?

It means conceptual use of the signs. Really it's ASL signs in English word order. So really, it's a bit of a mix between ASL and English. For example, in ASL, I would

sign "TREE CAT V:wg-CL`cat climbs up the tree'". If I was using CASE, I would sign "TREE CAT CLIMB". I would add the sign CLIMB where in ASL I wouldn't need to add that because I've already included that information using the classifier for "cat climbed up the tree".

Q Does it include speech?

Sometimes, sometimes. Really it just adds more structure. The children know when they see the ASL what it means, but in CASE it spells it out more.

Q I see. I just had come across that a few times and I didn't know what it meant.

CASE started a few years ago in the States because some hearing teachers that were working in Deaf programs were not ready for ASL. So they changed it. Really, ASL has always stayed the same. But there's a growing list of systems being used, like CASE, different names, but none of them are true languages. English is a language and ASL is a language, but all the others are just tools.

Q What does that stand for, CASE?

Conceptually, C-A -- , the E is for English, S for sign, the A, I forget what that stands for.

Q Thanks again.

My pleasure.

Appendix H: Story Grammar Scoring Protocol

Story 1A

SETCHAR1	giraffe male
SETCHAR2	elephant female
	SET swimming pool playing with the ball
IE	ball goes in water
IR	one/both want to get the ball elephant says "Look what happened" , "What am I going to do?"
IP	giraffe decides to get the ball giraffe decides to rescue the ball
ATT	giraffe jumps in pool giraffe swims toward ball giraffe tries to get ball
C	giraffe gets ball gives ball to elephant
R1	giraffe is happy, proud, smiles, says "You're welcome" giraffe stands with chattering teeth
R2	elephant is happy, grateful, says "Thank you"

Story 2A

SETCHAR1	giraffe male horse
SETCHAR2	elephant female
SET	swimming pool , diving board going swimming
IE	elephant sees the diving board elephant sees "no running" sign elephant wants to get in the pool
IR	elephant wants to jump off elephant wants to run elephant didn't care about the sign elephant thinks the sign is silly
IP	elephant decides to run over elephant decides to run on pool deck elephant decides to break the rules
ATT	elephant runs elephant heads across pool deck
C	elephant slips and falls elephant gets hurt
R1	giraffe feels bad, worried, concerned giraffe runs over to help giraffe asks if she's OK giraffe looks at what has happened

R2	elephant feels bad/upset, hurt elephant holds knee/crys
SETCHAR3	lifeguard elephant male
IE	lifeguard sees elephant lifeguard sees there is a problem lifeguard comes over giraffe calls for lifeguard
IR	lifeguard thinks elephant needs help lifeguard wonders/asks what happened
IP	lifeguard decides to help
ATT	lifeguard goes to help elephant lifeguard puts band-aid on knee
C	lifeguard and giraffe help elephant sit down lifeguard fixes knee
R1	giraffe is relieved giraffe is concerned giraffe explains what happened
R2	elephant feels better/embarrassed elephant feels bad elephant listens to lifeguard elephant grins elephant is crying elephant looks up at lifeguard

R3	lifeguard tells elephant not to run lifeguard points to sign lifeguard tells elephant to be careful lifeguard is cross/not impressed

Story 3A

SETCHAR1	giraffe male Horse
SETCHAR2	elephant female
SET	swimming pool going swimming holding/playing with airplane
IE	elephant sees giraffe playing with the airplane giraffe playing with airplane giraffe wants to show elephant his airplane giraffe gives airplane to elephant
IR	elephant wants the airplane elephant was enthralled with airplane
IP	elephant decides to take the airplane
ATT	elephant takes the airplane elephant zooms the airplane all around
C	airplane falls in the pool

R1	giraffe is angry giraffe is not impressed giraffe yells at elephant giraffe stares at the airplane
R2	elephant feels bad Elephant feels embarrassed Elephant is terrified elephant stares at the airplane Elephant says "oops"
SETCHAR3	lifeguard elephant male
IE	elephant sees lifeguard lifeguard comes along elephant asks lifeguard if he can help lifeguard notices airplane in water
IR	elephant hopes lifeguard can help lifeguard asks what happened lifeguard agrees to help
IP	elephant decides to ask for help
ATT	elephant asks lifeguard to get airplane out lifeguard reaches for airplane
C	lifeguard can't reach airplane
R1	giraffe upset/sad giraffe feels guilty/worried giraffe cries, giraffe stares at airplane in water

R2	elephant upset elephant feels bad elephant feels guilty elephant looks sheepish elephant tries to apologize to giraffe
RF3	lifeguard disappointed lifeguard shrugs lifeguard says he can't reach it
SETCHAR4	second lifeguard elephant female elephant's mom neighbor
IE	female lifeguard comes over to help female lifeguard has a net female lifeguard comes over
IR	female lifeguard wants to help get the airplane female lifeguard knows how to solve the problem female lifeguard offers to help
IP	female lifeguard decided to try to get the airplane female lifeguard has net to get airplane female lifeguard has an idea
ATT	female lifeguard reaches for airplane with the net
C	female lifeguard gets airplane Female lifeguard gives airplane to giraffe
R1	giraffe is happy giraffe is amazed, excited, giraffe hugs plane

R2	elephant is happy elephant feels better elephant is relieved
R4	female lifeguard is relieved, pleased

Story 1B

SETCHAR1	rabbit male
SETCHAR2	dog female male
SET	sandbox digging
IE	rabbit sees dog building a sandcastle dog is building a sandcastle they are building a sandcastle together rabbit fills up pail with sand rabbit asks dog if he can play with him
IR	rabbit wants to help make the sandcastle they want to play together
IP	rabbit decides to help make the sandcastle Rabbit has plan to add to sandcastle
ATT	rabbit pours/dumps sand on the castle

C	sandcastle is smashed/broken sandcastle collapses
R1	rabbit is embarrassed/feels bad rabbit is disappointed rabbit looks sheepish rabbit looks surprised rabbit stares at the collapsed castle
R2	dog is upset/sad, mad, devastated dog is shocked dog tries to fit sandcastle dog looks surprised dog is crying

Story 2B

SETCHAR1	rabbit male
SETCHAR2	dog female male
SET	walking have picnic baskets
IE	rabbit has lots of food dog asks rabbit to join her for picnic going for a picnic take out food and set up picnic
IR	rabbit is excited about all the food he brought/wants to eat rabbit is hungry

IP	rabbit decides to eat as much as he can/all his food
ATT	rabbit eats all the food very quickly
C	rabbit eats too much rabbit falls down rabbit gets sick rabbit is full
R1	rabbit feels dizzy/sick rabbit feels bad rabbit falls down rabbit lies there
R2	dog is concerned dog watches rabbit
SETCHAR3	doctor Rabbit female
IE	dog sees doctor dog asks doctor to come help dog runs to find a doctor/help
IR	dog wants to get help doctor asks what happened
IP	dog decides to ask doctor to help doctor decides to help
ATT	dog gets doctor pulls doctor to rabbit doctor comes over to examine rabbit

C	doctor checks rabbit/gives medicine doctor takes rabbit home doctor makes rabbit feel better
R1	rabbit feels better rabbit learns not to eat so much rabbit goes home with doctor
R2	dog feels relieved dog stays with picnic dog watches the two rabbits leave
R3	doctor is happy doctor is surprised doctor tells rabbit not to eat so much doctor takes rabbit home

Story 3B

SETCHAR1	rabbit male
SETCHAR2	dog female male
SET	walking with a wagon has a balloon
IE	rabbit sees the balloon
IR	rabbit wants the balloon rabbit thinks the balloon is nice
IP	rabbit decides to untie the balloon

ATT	rabbit unties the balloon rabbit takes balloon
C	balloon floats away they can't catch it
R1	rabbit is upset rabbit tries to get it, misses catching it rabbit apologizes to dog rabbit stares at balloon
R2	dog is upset dog is furious with rabbit dog tries to get it, misses catching it dog stares at balloon
SETCHAR3	balloon seller rabbit holding balloons man holding balloons
IE	rabbit sees balloon seller man is selling balloons rabbit remembers balloon seller has balloons rabbit runs up to balloon man
IR	rabbit wants to get balloon
IP	rabbit decides to get a balloon rabbit has an idea
ATT	asks for a balloon [A1, A3, asks how much balloons cost [A2, rabbit points to balloons [A5,

C	has no money so can't get a balloon fails to get balloon has nothing
R1	sad, disappointed says "What are we going to do?" rabbit stares at balloons
R2	dog stares at balloons
R3	
SETCHAR4	mother doctor female rabbit
IE	rabbit and dog see doctor
IR	think/hope they can get money/help
IP	decide to approach doctor for help
ATT	asks doctor for help/money points to balloon seller explains about losing balloon rabbit points to balloons
C	doctor pays for/buys two balloons doctor gives him money
R1	rabbit is happy rabbit thanks doctor

R2	dog is happy dog thanks doctor
R4	doctor is happy doctor gives them the balloons

Appendix I: Parent and Child Consent Forms

PARENTAL CONSENT FORM

Title: Development of the Picture Story Language Instrument for Deaf Children

Researchers: Rita Vis Dubé, Doctoral Student, Phyllis Schneider, Assistant Professor, Gary Holdgrafer, Professor; University of Alberta

We are conducting a study to develop a way to describe the language skills of children who are deaf. The reason for developing this instrument is to help teachers better understand the language skills of the deaf children that they teach. We would like to include your child in this study.

Your child will be shown several series of pictures. The researcher will ask your child to tell a story from the pictures. Next the researcher will ask your child to match a series of line drawings as part of a test of non-verbal problem-solving skills. Finally, your child will play or talk with a schoolmate for approximately 20 minutes. All of this will be videotaped. These videotapes will be analyzed to gather information about the language skills of deaf children. These videotapes will be saved and possibly used for future analysis.

As well, we ask that you fill out the attached "Family Questionnaire". This questionnaire contains a number of questions about your family. The purpose of this questionnaire is to collect information about the group of children who will be participating in this study. Your child's teacher will be asked to answer some questions about your child's language use at school. Your child will also be asked to sign a consent form saying that he or she agrees to participate in the study (if your child is 8 years old or older). Your child has the right to refuse to participate at any time without negative consequences.

We hope that the results of this study will help educators to provide the best programs possible for deaf children. Only the researchers will have access to the information provided by yourselves and your child, including the videotapes. Your child's name will not be used in any of the final results of this study or future studies of this information. Your child's school will be provided with a summary of the results of this study. This information is available to you as well.

We appreciate your cooperation with our study. If you have any questions about this study, please contact Rita Vis Dubé at (905) 707-1970.

If you agree to have your child included in this study, please fill out this form and return it, along with the completed "Family Questionnaire" to your child's teacher.

I have read this form and the attached questionnaire and understand the purpose and procedures for this study. I give permission for my child to participate in this study. I understand that I may withdraw my consent to participate at any time. As well, my child has the right to refuse to participate in the study. My child's participation in this study will not effect his/her school program or performance. I have received a copy of this form.

Child's Name:_____ Date:_____

Parent/Guardian's Signature:_____ Researcher:_____

CHILD CONSENT FORM

Title: Development of the Picture Story Language Instrument for Deaf Children

I will sign stories to Ms. Dubé. I will also take a test with pictures and play or sign with another child. I will let her videotape me doing these things. This is not part of my schoolwork. I can quit if I do not want to do this.

My name will not be used for this study. These stories will be private.

Child's Signature: _____

Date: _____

Researcher: _____

* To be used with children ages 8 years old and above.

Appendix J: Administration Guidelines for the PSLI

ADMINISTRATION PROCEDURES FOR THE PICTURE STORIES

Developed by Rita Vis Dubé & Phyllis Schneider

Pictures drawn by Terry Willis, Wooket Graphics,
based on original stories by RV Dubé & P Schneider

The picture stories consist of 6 individual stories. The "A" series of pictures are set at a swimming pool and involve an elephant and a giraffe as the main characters. The "B" series of pictures are set in a park and involve a dog and a rabbit as the main characters. All stories were developed using the story grammar model. Within each series, there is a 1-episode story (consisting of 5 pictures), a 2-episode story (consisting of 8 pictures) and a 3-episode story (consisting of 13 pictures). The pictures for the stories are black and white line drawings with cartoon characters. Each picture is approximately 6" x 71/2". The pictures may be used loosely or collated into a book format.

Administration of the stories should be done in a quiet room with a table and chairs for the researcher and the child. The table and chairs should be the appropriate size for the child. If a naive listener situation is desired, a third person is required to act as the listener for the stories (it is unrealistic to ask the child to assume that the researcher is unfamiliar with the stories). All stories should be videotaped (audiotaping should be used for spoken stories).

The administration procedures are as follows.

1. If the child is unfamiliar with the researcher, spend a few minutes with the child to develop a rapport.

2. For children who are 8 years or older, they should sign a child consent form. Have the child read the form (or read through it with them). Ask the child if they understand what the form says and if they have any questions about it. If they agree, have the child sign the form.

3. Explain to the child that you have some picture books. You would like the child to tell you stories from the books. The books have no words in them so the child can make up the story as they see fit.

4. Choose either series "A" or series "B" to be administered first. Stories within each series should be administered in increasing length (i.e., 1-episode, 2-episode, 3-episode). In a study involving multiple subjects, the order of administration should be varied so that series "A" is administered first for half of the subjects, followed by series "B". For the other half of the subjects, series "B" should be administered first, followed by series "A".

5. Give the child the picture booklet (or lay out the pictures in the correct order, if loose pictures are used). Instruct the child to look over all of the pictures, and then tell you a story when they are ready.

6. While the child is telling the stories, they should turn the pages of the book by themselves. Assistance may be given to hold down the book. As well, the researcher may point out if a page/picture is missed.

7. No cues about the pictures should be given. If the child asks what an animal is, or about the setting, tell them that it is their story and so they can make up anything they want.

8. Feedback throughout the story should be limited to neutral responses such as "uh-huh", "okay", etc.. Praise at the end of each story, such as "good story" or "I liked that story" may be used.

9. After the story is completed, remove the pictures and present the child with the next book or set of pictures. The same instructions should be repeated for each story.

10. Young children may require a break between the stories. A logical time for a break would be after the first series of picture stories has been completed.

Appendix K: Description of the Test of Nonverbal Intelligence (TONI-2)

Test of Nonverbal Intelligence (TONI-2)
(Brown, Sherbenou, & Johnsen, 1990)

This instrument contains 55 items that require nonverbal problem solving strategies to successfully complete. The following problem solving rules are included:

- Simple matching
- Analogies (matching, addition, subtraction, alteration, progressions)
- Classification
- Intersections
- Progressions

The authors of this instrument included a sample of deaf students in their normative group. Forty-six deaf students at a residential school were administered the test (mean age 16.1). Reliability with this sample was:

- Internal consistency: KR-21: .90 (form A); .91 (form B)
- Alternate forms: .87

Information regarding the development of the test (including validation and item analysis) is found in the examiner's manual.

Copyright permission for the use of this instrument in the present study is covered by the general copyright permission granted by the copyright holder for use in research studies.

Appendix L: Teacher Rating Form

TEACHER'S RATING OF STUDENT'S LANGUAGE ABILITIES

Student's Name: _____

Current Grade Placement: _____

Number of years in the current educational program? _____

Which of the following do you use in your classroom? (Check all that apply)

_____ American Sign Language (ASL)
_____ Written English
_____ Signed English
_____ Spoken English
_____ Other _____

How long have you taught this student? _____
How long have you known this student? _____

How would you rate this student in the following areas, as compared with all other students of the same age that you have taught (check the appropriate box):

Use of:	Top 25%	2nd 25%	3rd 25%	Bottom 25%	Not Applicable
ASL					
Written English					
Signed English					
Spoken English					

Additional Comments: _____

_____

_____

_____

Appendix M: Parent/Family Questionnaire

FAMILY QUESTIONNAIRE

Please answer the following questions about your family. All information will be kept confidential. If you have any questions about this form or would like some help in filling it out, please let me know.

ABOUT YOUR CHILD...

Child's Name: _____ **Date of Birth**: _____ **Male or Female**

How old was your child when he/she was first diagnosed as having a hearing loss?

_____

How would you describe your child's hearing loss (circle one for each ear):

Right Ear:	mild	moderate	severe	profound
Left Ear:	mild	moderate	severe	profound

Does your child wear hearing aids? Yes _____ No _____
If yes, 1 or 2 hearing aids? _____
If no, has he/she ever worn hearing aids? _____ At what age? _____

List the educational programs your child has been involved with:

Early Intervention: _____
_____
Preschool: _____
_____
Elementary School: _____
_____

ABOUT YOUR FAMILY...

List other family members and their relationship to the child:

Relation to child	Age	Hearing/Deaf/Hard of Hearing
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

What language/languages do you use at home? _____

ABOUT YOURSELVES...

Occupation:

Mother:	Father:
_____	_____

Highest Level of Education Completed:

Check One:	Mother	Father
High School		
College		
University		
Post Secondary		

Languages Used:

List the languages you use:	Mother	Father
1st Language		
2nd Language		
Other Languages		

Hearing Status:

Check One:	Mother	Father
Hearing		
Deaf		
Hard of Hearing		

Sign Language:

Do you use the following sign languages with your child?	Mother	Father
American Sign Language		
Signed English		
Other _____		

Sign Language Ability:

How would you describe your signing skills?	Mother	Father
Fluent		
Good		
Average		
Use a few signs		
Do not sign		

Appendix N: Description of Programs

Alberta School for the Deaf

Edmonton, AB

Number of students participating in study: 11

Program philosophy: This school follows an ASL/English bilingual/bicultural philosophy. Residential and day programs are provided for students from grades 1 to 12.

CONNECT Society – DEAF Services

Edmonton, AB

Number of students participating in study: 1

Program philosophy: This agency provides a number of different programs for preschool-aged children. The student who participated in this study was in a ASL/English bilingual/bicultural preschool/kindergarten program. It is a self-contained program for deaf children and is taught jointly by a Deaf teacher and a Hearing teacher.

Provincial School for the Deaf, Jericho Programs

Burnaby, BC

Number of students participating in study: 15

Program philosophy: This school follows a total communication approach integrating ASL and spoken, written and signed English. Conceptually Accurate Signed English (CASE) is used within the classroom setting. A day program is provided at this school for students from grades 1 to 8. This program is housed within a traditional

elementary school. The program consists of self-contained classes and integration into the mainstream classes.

The Sir James Whitney School for the Deaf

Belleville, ON

Number of students participating in study: 12

Program philosophy: This school follows an ASL/English bilingual/bicultural philosophy. Residential and day programs are provided for students from kindergarten to grade 13.

Appendix O: Description of Subjects

Subject	Age	Gender	Grade	Hearing Level	Aided	Parental Hearing Status	1st Lang[a]	2nd Lang	3rd Lang
1	7,1	M	1	Profound	No	Hearing	English	ASL	
2	7	F	1	Profound	No	Hearing	English	ASL	
3	7,1	M	1	Severe/ Profound	No	Hearing/Deaf	English	Home Sign	ASL
4	5,8	F	SK	Profound	No	Hearing	English	ASL	
5	6,11	M	1	Severe/ Profound	Yes	Hearing	English	ASL	
6	5,3	F	JK	Moderate Severe/ Severe	No	Hearing/Deaf	English	Home Sign	ASL
7	4,11	M	JK	Profound	No	Hearing	English	Dutch	ASL
8	11,2	M	5	Profound	No	Hearing	English	ASL	
9	10,9	M	5	Profound	No	Hearing	English	ASL	
10	10	M	4	Profound	No	Hearing	English		
11	7,1	F	2	Profound	No	Hearing	English	ASL	
12	9,5	M	4	Profound	No	Hearing	English	ASL	
13	9	M	3R	Mild/ Moderate	Yes	Hard of Hearing	Russian	English	ASL
14	9,1	M	4M	Severe/ Profound	Yes[b]	Hearing	English	SE	
15	7,7	F	2	Moderate Severe/ Profound	Yes	Hearing	English	ASL	Spanish
16	9,4	M	3	Moderate Profound/ Profound	Yes	Hearing	English	ASL	
17	10,1	M	4	Severe/ Profound	No	Hearing	Laos	English	Chinese
18	8,1	M	2	Severe/ Profound	Yes	Hearing	English	ASL	Chinese
19	7,7	F	2	Severe/ Profound	Yes	Hearing	English	ASL	
20	7,6	M	1/2	Profound	No	Hearing	Polish	English	ASL
21	7,1	M	1/2	Profound	No	Hearing	English	ASL	
22	8,7	M	3	Profound	No	Hearing	English	ASL	
23	10	F	4	Severe	No	Hearing	Filipino	English	ASL
24	10,2	M	4	Severe/ Profound	Yes	Hearing	English	ASL	
25	9,7	F	4R	Profound	Yes	Hearing	Chinese	English	ASL
26	10,5	M	4	Severe/ Profound	No	Hearing	English	ASL	
27	10,4	M	4	Severe/ Profound	Yes	Hearing	Hungarian	English	ASL
28	8,9	M	3	Profound	No	Hearing	English	German	ASL
29	10,5	F	5	Profound	Yes	Hearing	English	ASL	
30	10,1	F	5	Profound	No	Hearing	English	ASL	
31	8	M	2	Profound	No	Hearing	English	ASL	Other
32	8,11	M	2	Moderate/ Profound	Yes	Hearing	English	ASL	
33	7,9	F	2	Profound	Yes	Hearing	English	ASL	
34	6,4	F	1	Severe Profound/ Moderate Severe	Yes	Hearing	English	German	ASL
35	6,11	F	2	Severe/ Profound	No	Hearing	English	ASL	German

36	7,11	F	2	Profound	No	Deaf	ASL	English	
37	7,5	F	2	Profound	No	Deaf	ASL	English	
38	9,7	M	3	Profound	No	Deaf	Polish SL	ASL	English
39	4,1	M	PreSch	Profound	No	Hearing	English	ASL	French

[a] Language use reported by parents
[b] Cochlear Implant